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ORIGINAL ARTICLES

THE PHYSICS OF BLAST

BY G. A. SUTHERLAND, M.A. Camb.
SPECIAL LECTURER IN PHYSICS, UNIVERSITY OF MANCHESTER

THE prime characteristic of any form of wave motion is that whereas the disturbance itself moves forward the particles of the medium through which it passes do not move with it but oscillate backwards and forwards about equilibrium positions. The oscillations may be either across or along the line of propagation. In water waves they are across it. Breakers on the seashore are not an example of wave motion, they are a tidal effect. But a cork on the surface of deep water over which waves are passing horizontally will simply bob up and down vertically. Such waves are called transverse waves. Where the oscillations are in the line of propagation the waves are called longitudinal waves. A simple example of a longitudinal wave or pulse is provided by a row of pennies in contact on a table. If one of the pennies is detached from the end of the row and a pulse started by flicking this penny so that it hits the near end of the row the result is that the penny at the other end is knocked off (fig. 1). The pulse has travelled

FIG. 1.

from end to end although the intermediate pennies keep their positions. What happens is that each penny is compressed in turn by the impact and in recovering passes the impulse on to the one next it. If a double pulse is imparted by flicking two pennies, one behind the other, against the end of the row then two pennies come off together at the other end (fig. 2).

Sound waves—and blast is simply an excessively intense sound wave—are similarly longitudinal; that is to say, the air particles propagate the disturbance by moving backwards and forwards in the line of the disturbance itself. For the sake of simplicity imagine that the origin of the blast is a small sphere of explosive material. When this is fired it expands suddenly and compresses a spherical shell of air immediately surrounding it. The air cannot avoid this sudden pressure but once it is released the elasticity of the compressed air in

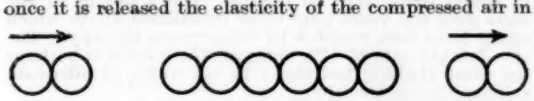


FIG. 2.

the shell tends to make it recover its original state. In this it overshoots the mark, with the result that an outside shell is compressed in turn and a shell of rarefied air is left behind. Thus the sound pulse consists of a compression followed by a rarefaction and is propagated outwards. But the air particles move outwards from, or inwards towards, the centre according to the particular phase of the disturbance in which they are taking part at the moment.

The maximum movement of any air particle on each side of its normal undisturbed position is called the amplitude of the wave and clearly depends on the violence of the explosion. In the case of bomb explosions such as are now being experienced the amplitudes are considerable, for in the compression part of the wave pressures up to 200 atmospheres—i.e., 1½ tons per square inch—have been observed. Considering the excessive violence of bomb explosions, it is therefore not to be wondered at that the difference in degree between the effects of these and of normal sounds is mistaken for a difference in kind. But there is no warrant for the view that except within a few feet of the explosion the disturbance is different in character from a sound wave of high amplitude.

The phrase "beating the air" is commonly used to denote ineffectiveness. Beating the air *is* normally ineffective, simply because the mobility of the air generally makes it easy for it to escape round the edges of the beating object. The more sudden and violent the beating the less is this true, and the more will the air act not like a mobile gas but a rigid object. The so-called fluid flywheel in a car is supposed to damp out shocks between the engine and the transmission, and with such a mechanism and a suitable gear box it is possible to pass straight from forward to reverse gear. But if this is attempted at high speed it should preferably be done on someone else's car, for the shock to the transmission would be considerable. The makers' claim that at high speeds there is practically no slip and therefore practically no transmission loss is merely a claim that the liquid has acquired an unwonted rigidity by its very speed. Ironically this is also a claim that at such speeds it has lost the very property of absorbing transmission shock that is supposed to give it its great value. In a similar way the violence of blast makes its beating of the air so effective that it can bruise the walls of the lung as if they had been hit by a solid object.

Apart from the particular feature of wave propagation referred to there are other essential characteristics of wave motion which account for the apparently freakish behaviour of blast. There is, for example, the way it produces its effects on the far side of objects of considerable size. When a sound wave meets the wall of a room it does, it is true, set up a similar wave in the material of the wall itself which in turn produces a second air wave on the far side of the wall. But the attenuation in such a case is so great that the intensity of the transmitted wave is only about a millionth of that of the original wave and the amount of sound so transmitted is thus in most cases negligible. What does happen, however, is that the whole wall is itself set in vibration like a diaphragm and it is for this reason that homogeneous light partitions are so ineffective in shutting out sound. Similarly the more violent blast wave may produce so sudden a diaphragm movement of the outside wall of a shelter that, even if that movement is only a fraction of an inch, the impact of the solid wall may be violent enough to fracture the skull of anyone resting his head against it. This is the case with the wall of an enclosed space. But with a wall in the open the effect of the wave will appear on the far side in a third way, by bending round the edges. It is a matter of common experience that the interposition of even a large object does not prevent such bending nor provide any shelter except for a very small distance behind it. This again is a characteristic feature of wave motion. Any object to act as a screen must be comparable in size with the length of the wave in question. High-pitched sounds have short wave-lengths down to about a third of an inch but waves of sounds of the pitches that predominate in explosions may be as long as 30 feet. How effective even a wall 30 feet square would be in stopping a wave of 30 feet length would evidently depend on the distances both of the source and of the observer from the wall in question. Anyone who has watched the effect of a rock on waves in the sea will appreciate the point. A comparatively small rock will reflect back a ripple but long waves will bend round it almost as if it were not there.

In practice blast waves do meet objects that are large enough to reflect them and the original direction may be changed over and over again by successive reflection. Thus the effect may travel from side to side of a street flanked by high buildings for some distance, leaving a trail of damage in its wake. But such a phenomenon may have curious superposed anomalies—for example, certain points in the path of the wave may appear to be left out. This corresponds with the well-known phenomenon of deaf points in a badly designed auditorium and is the result of what is called interference. Direct and reflected waves superposed will reinforce each other if compression coincides with compression and rarefaction with rarefaction, but if they are out of step by half a wave-length so that compression and rarefaction coincide they will cancel each other out. In suitable circumstances "stationary waves" are formed and result in a series of points of cancellation and points of reinforcement.

The effectiveness of a dividing wall in shutting out sound is a simple function of the weight per square foot

and what applies to sound in general also applies to the particular case of blast. With a homogeneous wall it does not matter what the wall is made of, this law of weight is true. But it is not only solid objects that divert a sound wave from its path; atmospheric conditions can produce surprising results. Varying temperature at different heights can divert a wave upwards. Striking a column of hot air may throw the wave back in the direction from which it has come. The sound of gunfire, for example, would be much enfeebled if there were a fire between the gun and the observer. Such measures, however, cannot be applied for practical protective purposes, which must still rely for their effectiveness on adequate weights of material between the source and the observer or victim.

CHEMOTHERAPY OF CEREBROSPINAL FEVER IN CHILDHOOD

By Margaret I. Williams, M.B. Manc., M.R.C.P., D.C.H.

SENIOR RESIDENT MEDICAL OFFICER AT ALDER HEY CHILDREN'S HOSPITAL, LIVERPOOL

This report[1] covers 102 cases of cerebrospinal fever admitted to Alder Hey Children's Hospital, Liverpool, between Jan. 1 and May 31, 1940. Since January, 1939, all cases of meningitis admitted have been treated by chemotherapy alone. All patients were under 16 years of age.

ROUTINE TREATMENT

Lumbar puncture is performed on every case on admission, and the organism is typed. If the fluid is turbid sulphanilamide is given immediately. Sulphanilamide is used because it is much more readily tolerated by children than M. & B. 693 and causes less vomiting; it is also cheaper, and for a time M. & B. 693 was difficult to obtain. The powdered form of sulphanilamide is made up into a suspension as follows:—

Sulphanilamide ..	gr. 24	Tragacanth	gr. i
Tinct. aurant.	℥ iii	Aquæ	ad oz. i

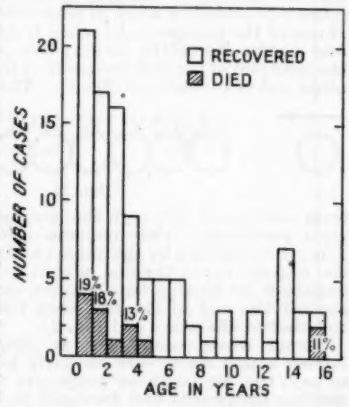
If there is any vomiting the lost dose is immediately readministered. In a few cases M. & B. 693 has been given at the same dosage rate, intravenously as M. & B. 693 soluble whenever necessary, and in tablet form when there has been an accompanying bronchopneumonia or, in chronic cases, to alternate with sulphanilamide. Administration is continued for 10 days in an ordinary case but the time may be decreased if toxic symptoms appear and lengthened if the cerebrospinal fluid is not sterile on the tenth day. A second lumbar puncture is performed after 24 hours' treatment, the fluid is cultured and its sulphanilamide content estimated; if this is adequate (over 5 mg. per 100 c.cm.) and the fluid is sterile no more lumbar punctures are performed until the tenth day. If the concentration is insufficient, however, the dose of sulphanilamide is adjusted until the required concentration is reached and the punctures repeated until the fluid is sterile. A lumbar puncture is always performed on the tenth day. If the fluid is clear and sterile and the child's general condition is normal treatment is then discontinued. Fluids are given freely throughout. Most children take fluids readily to the extent of several pints a day but where there is much vomiting and dehydration continuous intravenous-drip saline may be necessary. This has often proved a life-saving measure. Regular blood-counts are done, and ferrous and ammonium citrate in suitable doses is given as soon as the child begins to take solid food.

RESULTS

The age-incidence in the series is shown in table I and the figure. It will be seen that a large proportion (53%) of cases occurred in the first three years of life. Out of 102 cases 13 died, the case-fatality rate being 12·7%. Of these 13 only 7 received adequate therapy for periods varying from twenty-four hours to thirty days; they were found at autopsy to be without complications. Of the other 6 deaths, 1 occurred two hours after admission, in a patient who had received an initial dose of sulphanilamide; 2 in the early part of the epidemic occurred twenty and twenty-two hours after admission, and further experience suggests that they might have been avoided by intravenous saline therapy; 2 cases, both complicated by bronchopneumonia and having received an inadequate dosage of sulphanilamide or sulphapyridine, died in just over twenty-four hours, one having been ill for five weeks at home. The final case appeared to be improving but respiratory symptoms developed on the third day, and she died on the fifth day; post-mortem examination revealed a clearing meningitis and extensive pulmonary tuberculosis.

TABLE I—AGE AND CASE-FATALITY RATE

Age (years)	Cases	Deaths	Case-fatality rate (%)
0– 1	21	4	19
1– 2	17	3	17·6
2– 5	30	4	13·3
5–10	16	0	0
10–15	18	2	11·1
Total	102	13	12·7



The most favourable age-group was five to ten years, in which there were no deaths. The 2 deaths in the cases over ten years were those mentioned above which might have been avoided by intravenous therapy. The case-fatality rate of 19% amongst the infants is perhaps the most striking testimony to the value of adequate sulphanilamide therapy.

TABLE II—GROUPS OF ORGANISMS AND CASE-FATALITY RATE

Group	Cases	Deaths	Case-fatality rate (%)
I	79	9	11·4
II	17	3	17·6
Indeterminate	2	0	0
Not typed	4	1	25·0
Total ..	102	13	12·7

The meningococci were grouped at the Alder Hey Laboratory and all specimens were sent to the City Laboratory, Liverpool, for confirmation. In the 102 cases, 79 (77·4%) were group I and 17 (16·7%) group II; in 2 the group was not determined as the strains agglutinated equally well with both group sera and 4 were not typed.

DOSAGE AND CONCENTRATION

Sulphanilamide by mouth was given alone to 94 cases; 3 were treated with M. & B. 693 alone and 5 had both drugs. In this last group 2 became chronic, and the drugs were therefore alternated in periods of about 14 days over a total period of six to eight weeks; 2 were given M. & B. 693 for a few days because cerebrospinal fluid on the tenth day was not sterile and the fifth received M. & B. 693 soluble intravenously at the beginning of treatment for the first 4 doses because oral therapy

1. I have omitted 6 further cases, of which 1 was brought in dead, post-mortem lumbar puncture confirming the diagnosis; 2 were only in hospital a few hours and received no treatment; and 3 had signs of meningitis with typical findings in the cerebrospinal fluid and responded well to sulphanilamide, but no meningococci were demonstrated.

proved impossible. Two cases received serum intrathecally and intramuscularly.

The dosage of sulphanilamide was calculated on a minimum of 0·08 g. per pound of body-weight per day, and an initial dose equivalent to at least half of the total daily dose was given; after that the drug was given 4-hourly. For infants under 1 year, 0·13–0·2 g. per pound of body-weight was given. The average dosage worked out as follows:—

Years	Initial dose	Daily dose
0– 1	1·5 g.	2·5 g.
1– 2	2 g.	2·5 g.
2– 5	2 g.	3 g.
5–10	3 g.	4·5 g.
10–15	5 g.	7 g.

The sulphanilamide content of the cerebrospinal fluid was estimated by the method described for blood and urine by Werner (1939), using Ehrlich's reagent as an indicator; a concentration of over 5 mg. per 100 c.cm. was thought to be adequate, although higher concentrations than this were often obtained. The concentration tends to fall during the period of treatment and there did not appear to be any constant relation between sulphanilamide content and fatality-rate.

Of the total of 90 lumbar punctures performed at the end of twenty-four hours' therapy, 69 (76·7%) were found to be sterile. Of these cases, 3 died, and in 2 others the cerebrospinal fluid gave positive cultures later, but finally cleared up.

COMPLICATIONS

In 9 cases (8·8%) purpura was present on admission or developed during treatment; 1 of these died. There appeared to be no greater tendency to the development of anæmia or other toxic manifestations in this group. In 6 cases there was labial herpes, in 2 very severe.

Paralysis of the sixth cranial nerve occurred in 5 cases, and of the seventh in 3. All these recovered from their meningitis and the cranial-nerve palsies cleared satisfactorily. Nerve deafness developed and persisted in 1 child, and he became difficult to manage; it was not clear whether this behaviour difficulty was due to deafness or to mental changes. No other patient showed mental deterioration, though this may become evident later in the infants if they develop hydrocephalus. No cases of hydrocephalus became evident during treatment. In 1 patient iritis developed, causing posterior synechiæ.

Any case in which the cerebrospinal fluid was not clear and sterile within fourteen days was considered to have become chronic. There were 3 such cases, and of these 1 died. The duration of the infection varied from thirty to fifty-eight days, and sulphanilamide or M. & B. 693 was administered alternately throughout the whole period; serum was given later in 2 cases but did not appear to have any significant effect—indeed, the patient who died received serum. In spite of the long illness there were no toxic manifestations from the sulphanilamide or complications of meningitis, but convalescence was more prolonged and difficult.

During sulphanilamide therapy all sulphur-containing foods and purgatives were withheld; in spite of this almost every case became cyanosed though with no apparent ill effects. In no case was cyanosis considered to be an indication for therapy to be discontinued. A morbilliform eruption, appearing towards the eighth or tenth day of treatment, occurred in 6 cases, and when it appeared and the condition of the child allowed it the drug was either discontinued or the dosage reduced. All these cases recovered.

In most cases there was a definite leucocytosis, the average white-cell count in 32 cases during the first three days being 24,000. As a rule this gradually fell during treatment. There were no examples of true agranulocytosis. In many cases red-cell counts were made in the first twenty-four hours, on the second day and then at varying intervals during treatment. It was not found possible to take blood-counts at absolutely regular intervals. In all, 160 counts were performed on 71 patients. In 16 the red-cell count fell slightly, as it might in any infection; in 21 there was no significant change; in 26 only one count was performed; in 8 cases a very severe anæmia developed. The characteristics of this anæmia were the sudden appearance of immature red cells—normoblasts and megaloblasts—in the circulating blood, and a sudden drop in red cells and hæmoglobin accompanied by marked anisocytosis and poikilocytosis: a picture compatible with intense bone-marrow disturbance or severe hæmolysis. Jaundice was never noticed. The general condition of the child deteriorated rapidly and blood-transfusion was almost always necessary, leading to a rapid improvement. This sudden anæmia appeared early in the treatment, from the third to the ninth day, and in only 2 cases was the child receiving an unusually large dose of sulphanilamide. In these cases the condition of the meningitis and not that of the hæmopoietic system was the basis of further regulation of the dosage of sulphanilamide or M. & B. 693. All these children recovered. In the 2 cases which received sulphanilamide or M. & B. 693 almost continuously for a period of more than 6 weeks, anæmia did not develop. These findings suggest that it is the susceptibility of the individual hæmopoietic system rather than the amount of the drug administered that determines the onset of this anæmia.

SUMMARY

Of 102 cases of cerebrospinal fever in patients under sixteen years of age treated with sulphonamides the case-fatality was 12·7%; in 54 under three years the rate was 14·8%, and in 21 under one year it was 19%. Sulphanilamide alone was given to 94 patients, the average daily dosage varying from 2·5 g. in infancy to 7 g. in older children and the usual period of treatment being ten days. Adequate initial dosage was considered to be of paramount importance. In 3 cases M. & B. 693 was given alone, and in 5 cases combined with sulphanilamide. Two cases received serum intrathecally and intramuscularly. Fluids were administered liberally, if necessary parenterally, and an iron mixture was given during convalescence.

Complications of sulphanilamide therapy were cyanosis, morbilliform eruptions and sometimes severe anæmia.

I wish to thank Dr. W. E. Crosbie, medical superintendent of Alder Hey Hospital, for permission to publish these cases, Dr. N. B. Capon and Prof. H. D. Wright for advice, Dr. Scott of the Ministry of Health for permission to make use of the results of his grouping, and Mr. A. C. Dawkins, senior technologist at Alder Hey Hospital, for his assistance in the laboratory.

The outpatient department of the Maudsley Hospital, Denmark Hill, S.E.5, will be reopened on Monday, Nov. 25. Outpatients should be sent to the hospital if possible by their own doctor and an appointment should be made beforehand. Hours of attendance at the hospital for adults are 9.30 A.M. to noon on Mondays, Wednesdays and Fridays. Children can also be seen during the Monday sessions. Appointments for adults may be made by 'phone at Rodney 3841 during hours of attendance and at Vigilant 0054 at other times. Appointments for children should always be made at Mill Hill 4276. All letters should be addressed to the medical officer in charge at the Maudsley Hospital.

The Carolinian Hospital, which stands near the city limits of Stockholm, was opened at the end of September by the King of Sweden. It has 1200 beds and can also treat a large number of outpatients. Special departments, such as the cancer hospital, the psychiatric clinic and the Cripples Hospital are each housed in separate buildings grouped round a huge central block. Large wards have been abolished in favour of smaller rooms and a standard unit is only intended for 25 patients and comprises, as a rule, two 6-bed, three 3-bed, one 2-bed and two single-bed wards. There is a personnel and staff of over 1300 persons and special buildings within the hospital area have been erected for them so that they may spend their free time away from their work. In many respects the hospital breaks with tradition. For instance there are bars where beer is obtainable, and smoking-rooms are provided. The very large bomb-proof underground quarters—which were not included in the original plans—are blasted out of the rock on which the hospital stands. The hospital has been built with money granted by the state and contributions from the city and district of Stockholm. The cost so far has been about £2,060,000. The Carolinian Institute with which the hospital is associated is Sweden's principal medical school and has an average of 1000 students, and the new hospital will provide the institute with more centralised observation facilities, as well as with new technical and scientific resources.

DEFICIENCY OF VITAMIN C AND VITAMIN P IN MAN*

BY HAROLD SCARBOROUGH, M.B., Ph.D. Edin.

(From the Clinical Laboratories, Royal Infirmary, Edinburgh)

BENTSÁTH et al. (1936, 1937) first suggested that the full clinical syndrome of scurvy in the guineapig was produced by a combined deficiency of vitamins C and P. This suggestion was based on experiments said to show that the length of survival of guineapigs on the Sherman-La Mer-Campbell scurvy-producing diet could be increased from 28·5 to 44 days by the administration of supplements of vitamin P. At autopsy the animals which had received these supplements showed significantly fewer hæmorrhages in the tissues. It was concluded that a deficiency of vitamin P is in part responsible for the hæmorrhages of scurvy, which should therefore be regarded as a mixed deficiency of vitamins C and P. It was considered that clinical signs of a deficiency of vitamin P alone could not be produced in the guineapig. Zilva (1937) has shown that the post-mortem appearances described by Bentsáth and his colleagues in the animals treated with supplements of vitamin P closely resemble the condition found in guineapigs receiving minute doses (0·1 mg. daily) of ascorbic acid. Zilva (1937) and Moll (1937) could not find any evidence for the existence of vitamin P from dietary experiments with guineapigs. Szent-Györgyi (1937, 1938) has since reported his failure to repeat his original experiments upon which the existence of vitamin P was based.

The problem of vitamin P has been studied again more recently (Scarborough 1939). A low capillary resistance in people with various forms of nutritional deficiency was found to be associated with a deficiency of vitamin P, but no clinical syndrome was described. Zacho (1939) observed that the capillary resistance of scorbutic guineapigs could only be restored to normal by the addition of ascorbic acid and vitamin P to the diet. Moreover, less hæmorrhage was found at autopsy in scorbutic animals treated with vitamin P. Todhunter et al. (1940) have found that scorbutic guineapigs receiving supplements of lemon-juice show fewer hæmorrhages than do animals receiving equivalent amounts of pure ascorbic acid.

The present communication demonstrates the existence of deficiencies of both vitamin C and vitamin P in man. In two cases clinical evidence of a deficiency of vitamin P alone has been induced experimentally.

MATERIAL AND METHODS

The six people studied in this investigation all had a clinical deficiency of vitamins but, apart from this, were free from other obvious organic disease, except case 1, whose blood gave a positive Wassermann reaction. Cases 4, 5, and 6 gave a history of chronic alcoholism. All were in bed in hospital during the investigation. On admission each patient was immediately submitted to rigid dietary control, the diet being as far as possible free from vitamins A, the B complex, C, D, and E. Insufficient is known about vitamins K and P to permit their certain exclusion from a human dietary. The calorific value of the diet was unrestricted.

Vitamin P was administered as an active fraction prepared from oranges, but the precise nature of the active substances present in the fractions has not been determined. For oral administration two different fractions were used: (1) a crude yellow powder deposited spontaneously during the desiccation of Californian Valencia orange-juice; and (2) a purer preparation obtained from (1) by extraction with pyridine and repeated crystallisations from aqueous pyridine. In case 5 vitamin P was administered parenterally; the preparation used was an aqueous solution (50 mg. in 1 c.cm.) of flavanones prepared from orange peel according to the method described by Szent-Györgyi (1938). The same preparation was also given by mouth to case 5. All of these fractions were free from ascorbic acid. In most cases ascorbic acid and vitamin-P concentrates were given by mouth, the former in solution, the latter as an aqueous suspension (1 g. in about 50 ml. of water).

The capillary resistance was determined by a positive-pressure technique. In this procedure the capillaries are ruptured by an increase of intracapillary pressure produced by the application of venous obstruction to the arm for a certain time. The ruptured capillaries are enumerated as petechial hæmorrhages in the forearm after release of the pressure. The pressure (mm. Hg) and the time (min.) for which it was permitted to act are indicated in each case in the upper left-hand corner of each chart. The pressure varies with each patient and is regulated so as to be just infradiastolic. The time for which the pressure is permitted to act is varied according to the response obtained. Thus, if the capillary resistance is low, many petechiæ will be induced in a short time; whereas, if the capillary resistance is high, a longer period of occlusion will be required before petechiæ can be enumerated in the forearm.

The capillary resistance is determined in terms of the number of petechiæ produced. A normal capillary resistance by this method is 0–20 (mean $\pm 2\sigma$). A decrease in the number of petechial hæmorrhages under these conditions is accordingly taken as a sign of an increased capillary resistance. Capillary-resistance determinations are recorded as a graph. Spontaneous hæmorrhages are recorded as vertical lines on the charts. The amount of this hæmorrhage has been roughly assessed by determinations of the total area (sq. cm.) of surface hæmorrhage. In cases 3 and 4 body-weight (in kg.), hæmoglobin level (as a percentage of the normal; 100% = 16·0 g. per 100 c.cm.), and knee flexion (in degrees) have also been determined (figs. 3 and 4). By the last term is signified the angle to which either the right or the left leg can be flexed on the thigh at the knee. In scurvy movement at this joint is often limited, in the absence of hæmarthrosis, because of either pain or hæmorrhage into the muscles of the thigh. Figs. 3 and 4 show that the measurement of this angle is a convenient and satisfactory guide to the progress of the scorbutic process in the early stages of treatment.

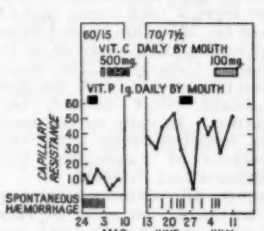


FIG. 1—Chart of case 1, showing that the capillary resistance was within normal limits, and that administration of vitamin P did not control the subcutaneous hæmorrhages, which, however, were arrested immediately by the administration of ascorbic acid.

FIG. 2—Chart of case 2, showing that the administration of vitamin P increased the capillary resistance but did not arrest the spontaneous hæmorrhages, whereas the administration of ascorbic acid stopped the hæmorrhage at once, although it did not affect the capillary resistance.

RESULTS

CASE 1.—A widower, aged 62, had had two weeks' pain, ecchymosis, and œdema of both legs. He had lived alone for nine months, during which his diet had contained no fruit, green vegetables, or meat. There was no history of alcoholism. His blood gave a strongly positive Wassermann reaction. There was slight œdema. Subcutaneous hæmorrhage: 74 sq. cm. Diagnosis: scurvy.

Fig. 1 shows that on admission and throughout the period during which observations were made his capillary resistance was within normal limits. Administration of vitamin P did not control the subcutaneous hæmorrhages, which, however, were arrested immediately by the administration of ascorbic acid.

CASE 2.—A female, aged 37, with four years' weakness, intermittent diarrhœa, dyspepsia, and dyspnœa on exertion. A month before admission she developed swelling and bleeding of the gums. Owing to diarrhœa and dyspepsia her diet had been restricted for the last six weeks almost entirely to bread,

* The work reported here formed part of a study of vitamin deficiencies carried out during the tenure of a Beit Memorial Fellowship in 1939.

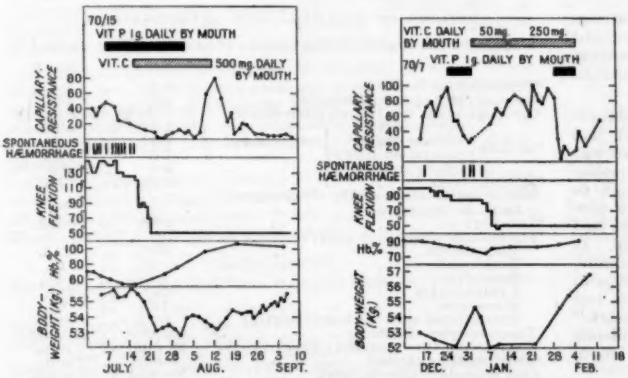


FIG. 3—Chart of case 3, showing that the administration of vitamin P did not arrest the subcutaneous hæmorrhages, which, however, were controlled immediately by the administration of ascorbic acid, whereas the capillary resistance was increased by the administration of vitamin P but not of ascorbic acid. The amount of knee flexion indicates the progress of the scorbutic process in the early stages of treatment.

FIG. 4—Chart of case 4, illustrating the same effects as does fig. 3 and showing further an increase of capillary resistance produced by the administration of vitamin P both before and after treatment of the scorbutic condition with ascorbic acid.

margarine, jam, and tea. Before then it had been deficient in fruit and green vegetables. There was no history of alcoholism, and the blood gave a negative Wassermann reaction. There was no clinical œdema. Subcutaneous hæmorrhage: 8 sq. cm. Diagnosis: scurvy.

Fig. 2 shows that the administration of vitamin P caused an immediate and definite increase of capillary resistance but did not arrest the spontaneous hæmorrhages; these, however, were controlled at once by the administration of ascorbic acid, which also arrested the gingival bleeding within three days. The capillary resistance was not controlled by the administration of ascorbic acid.

CASE 3.—A bachelor, aged 65, with three weeks' swelling, pain, and discoloration of both legs. His diet had consisted for many years mainly of margarine, jam, white bread, sausages, and tea. Three years previously he had been in hospital with scurvy. There was no history of alcoholism. The blood gave a negative Wassermann reaction. There was no clinical œdema. Subcutaneous hæmorrhages: 26 sq. cm. Diagnosis: scurvy.

CASE 4.—A chronic alcoholic bachelor, aged 54, had lived alone for many years on a grossly deficient diet. Three weeks before admission he had had to give up his work as a butcher because of weakness and dyspnœa on exertion. He also had "muscular rheumatism" in the shoulders and arms and pain and stiffness in both legs. Three days before his admission to hospital several large ecchymoses appeared on the legs. The Wassermann reaction of the blood was negative. There was slight œdema. Subcutaneous hæmorrhage: 56 sq. cm. Diagnosis: scurvy.

Figs. 3 and 4 again show that the administration of vitamin P did not arrest the subcutaneous hæmorrhages, which, however, were controlled immediately by the administration of ascorbic acid. The capillary resistance in both cases was increased by the administration of vitamin P but not of ascorbic acid. In case 4 this has been shown to happen both before and after treatment of the scorbutic condition with ascorbic acid.

During the period of treatment with vitamin P the body-weight remained constant in case 3 but increased in case 4, the percentage of hæmoglobin decreased in both cases, and there was only slight improvement in the angle of flexion in both cases. Administration of ascorbic acid was associated in both subjects with a prompt fall in body-weight, owing to the loss of excess tissue fluid, and with an increase in the percentage of hæmoglobin, and the angle of flexion immediately returned to normal. During the period of treatment with vitamin P the clinical condition of neither case showed any improvement such as is always noted in scurvy within twenty-four hours of the administration of a large dose (500 mg.) of ascorbic acid.

No evidence has yet been adduced that a deficiency of vitamin P plays any part in the production of scurvy in man, and it is therefore pertinent to inquire whether there is any clinical syndrome produced by, and characteristic of, a pure deficiency of vitamin P. Since this question is most satisfactorily answered by the production of an experimental deficiency, the following two cases were investigated to determine whether or not clinical evidence of a deficiency of vitamin P could be induced by experimental feeding. The procedure was, briefly, to take two patients already showing clinical signs of deficiency of vitamins, to give them the "vitamin-free" diet already described, and to add thereto supplements of vitamins A, B_1, C, and D in doses sufficient to correct any deficiency of these vitamins. Capillary resistance was determined repeatedly to assess any deficiency of vitamin P.

CASE 5.—A chronic alcoholic bachelor, aged 54, had lived alone on a diet deficient in fruit and green vegetables. For six months before admission he had become increasingly weak and breathless on exertion. For the last six weeks he had had vague pains in the legs, and two weeks before admission he had noticed that he bruised easily. He subsequently developed spontaneous hæmorrhages in both legs, and spongy gums with gingival bleeding. The Wassermann reaction of the blood was negative. Clinical œdema was absent. Spontaneous hæmorrhages: 54 sq. cm. Diagnosis: scurvy.

Fig. 5 records this man's capillary resistance during four months on the "vitamin-free" diet. The chart shows that the administration of vitamin P by mouth in doses of 1 g. a day for seven days did not arrest the spontaneous hæmorrhages but did increase the capillary resistance, which effect was reproduced on a second occasion. Administration of 100 c.cm. of lemon-juice

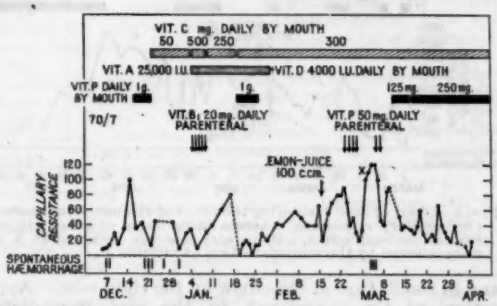

VIT. C mg. DAILY BY MOUTH
50 500 250 300
VIT. A 25,000 I.U. VIT. D 4000 I.U. DAILY BY MOUTH
VIT. P DAILY BY MOUTH 1g. 1g. 125mg. 250mg.
70/7
VIT. B1 20mg. DAILY PARENTERAL
VIT. P 50mg. DAILY PARENTERAL
LEMON-JUICE 100 c.cm.
CAPILLARY RESISTANCE
SPONTANEOUS HÆMORRHAGE
DEC. JAN. FEB. MAR. APR.

FIG. 5—Chart of case 5, showing that the administration of vitamin P did not arrest the spontaneous hæmorrhages but did increase the capillary resistance, whereas the administration of ascorbic acid arrested the spontaneous hæmorrhages but did not affect the capillary resistance. Pains and petechiæ occurred at X and were cured by the administration of vitamin P.

produced an immediate response, as also did the intramuscular injection of a vitamin-P preparation (50 mg. a day for four days). The spontaneous hæmorrhages were arrested by the administration of ascorbic acid, which did not, however, increase the capillary resistance. Administration of ascorbic acid (300 mg. a day by mouth) was continued throughout the experiment. Large doses of vitamins A and D by mouth and of vitamin B_1 parenterally were given over the periods shown in the chart. In spite of these measures the capillary resistance continued to fall. At the point X on the chart the patient began to have pain across the shoulders and in the arms. He complained of weakness, lassitude, pain in the legs, and "tired feet" when he walked. At this point spontaneous petechial hæmorrhages appeared on the legs. These were at first confined to an area at the level of the upper part of the boots but later developed both below and above this line. Petechial hæmorrhages were also present in the skin over both wrists and were induced immediately in both arms by the application of a tourniquet. The patient was now given a vitamin-P preparation by mouth

in doses of 125 mg. a day, and seven days later 250 mg. a day. The symptoms disappeared within forty-eight hours, and there was no further petechial bleeding. The capillary resistance gradually returned to the normal level.

CASE 6.—A bachelor, aged 56, with a history of chronic alcoholism, complained of dyspnœa on exertion, which had developed suddenly three weeks before admission. This was followed, three days before admission, by the sudden appearance of œdema of the legs and scrotum severe enough to prevent his getting about. There was anorexia and a prolonged history of neuritic pains in both arms. His diet had consisted for over a year mainly of carbohydrate foods. It included refined cereals and white bread in large amounts, jam, margarine, tinned milk, and meat. The Wassermann reaction of the blood was negative. There was œdema but no subcutaneous hæmorrhage. Diagnosis: "Beriberi heart." The diagnosis was supported by electrocardiographic evidence and by determination of the vitamin-B_1 content of the blood, which showed only a trace to be present.

Fig. 6 shows the effect of vitamin P in increasing the capillary resistance. Enormous doses of vitamins A (given parenterally and by mouth) and D (by mouth), B_1 (given parenterally and by mouth) and C (by mouth) did not control the capillary resistance, which progressively decreased to the point X on the chart, when the patient had "rheumatic pains" across the shoulders. He also complained of feeling tired and of "tightness" in both legs and pain in the feet and ankles, especially on exertion. Spontaneous petechial hæmorrhage was noted in the left forearm one morning when he awoke. Petechial spots developed the same day over the left ankle

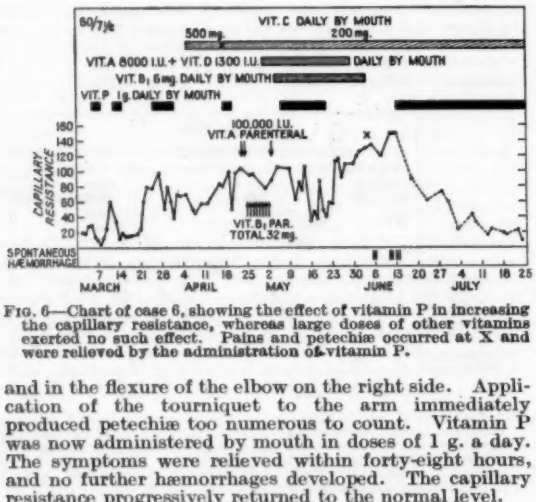


FIG. 6—Chart of case 6, showing the effect of vitamin P in increasing the capillary resistance, whereas large doses of other vitamins exerted no such effect. Pains and petechiæ occurred at X and were relieved by the administration of vitamin P.

and in the flexure of the elbow on the right side. Application of the tourniquet to the arm immediately produced petechiæ too numerous to count. Vitamin P was now administered by mouth in doses of 1 g. a day. The symptoms were relieved within forty-eight hours, and no further hæmorrhages developed. The capillary resistance progressively returned to the normal level.

The results of a hæmatological investigation made on these two men when the spontaneous petechial hæmorrhages developed are given in the accompanying table.

RESULTS OF HÆMATOLOGICAL INVESTIGATIONS

Heparinised venous blood was used for the examinations marked •

	Case 5	Case 6
•Erythrocytes (millions)	4·7	5·1
•Packed cell volume (Wintrobe)	40%	46%
•Hæmoglobin g. per 100 ml. (Newcomer)	16·2 (96%)	16·0 (95%)
•Indices (uncorrected): Colour-index	1·02	0·93
Volume-index	0·95	1·00
Saturation-index	1·07	0·94
Icteric index	4·0	6·0
•Reticulocytes	< 1%	< 1%
Blood sedimentation-rate (Westergren) (mm. in 1st hour)	5·5	2·0
•Leucocytes	4800	6000
•Differential count (500 cells):		
Polymorphs	60%	71%
Eosinophils	2%	1%
Basophils	0·5%	0·3%
Lymphocytes	26%	20%
Monocytes	10%	8%
Transitional cells (metamyelocytes)	1·5%	0%
Thrombocytes (indirect)	400,000	350,000
Coagulation-time (capillary tube)	10 min.	7 min.
Bleeding-time (Duke)	5 min.	7 min.
Clot retraction (Macfarlane)	Normal	Normal
•Plasma protein g. per 100 ml.	6·7	7·0
•Plasma fibrinogen g. per 100 ml.	0·18	0·21
Plasma prothrombin (Quick)	100%	102%
Serum calcium mg. per 100 ml.	9·0	8·7

COMMENTS

It is clear from the table that in neither case 5 nor case 6 was there any hæmatological abnormality which could explain the spontaneous bleeding. Since a much-increased fragility of the capillary walls (low capillary resistance) was determined in both cases, it is concluded that the spontaneous petechial hæmorrhages were due to this excessive fragility. The fact that these hæmorrhages appeared in areas of skin subjected to the external pressure of tight clothes or to the internal strain of an increased venous pressure either in the legs because of an erect posture or in the arms if the venous return is obstructed supports this conclusion. The increased fragility of the capillary walls, which ultimately leads to the development of petechial hæmorrhage, is regarded as an expression of a deficiency of vitamin P.

The experiments reported here show that at least two forms of subcutaneous bleeding may develop as the result of nutritional deficiency in man. One form is due to a deficiency of ascorbic acid and is arrested promptly by the administration of this substance but not of vitamin P. It is not necessarily accompanied by a low capillary resistance, although, since dietary deficiency in the human subject is almost always multiple, it is often associated with a decreased resistance. A decreased capillary resistance is an expression of a deficiency of vitamin P and is increased promptly by the administration of this vitamin but not of ascorbic acid. Spontaneous petechial bleeding may develop when the capillary resistance is low. It is associated with feelings of lassitude and easily induced fatigue and with pains in the shoulders and legs. It is an expression of a deficiency of vitamin P and is controlled by the administration of this vitamin.

The two forms of hæmorrhage are different in appearance. The hæmorrhages characteristic of a deficiency of ascorbic acid are large (ecchymoses) and involve considerable areas of subcutaneous tissue and muscle. The gingival bleeding which develops in scurvy is an expression of a deficiency of vitamin C and is not controlled by the administration of vitamin P. The hæmorrhages developing as the result of a deficiency of vitamin P are always small (petechiæ) and take place in the skin. They are often circumpilar. Both forms of hæmorrhage tend to appear first, and are often more severe in parts exposed to the pressure of clothing and in the legs because of the higher venous pressure in that part.

It is possible that some forms of purpura may have a nutritional basis; some support for this view has already been obtained (Scarborough and Stewart 1938).

CONCLUSIONS

The administration of vitamin P does not control the large subcutaneous hæmorrhages characteristic of the scorbutic state. These hæmorrhages are arrested within twenty-four hours by a large dose (500 mg.) of ascorbic acid.

The administration of vitamin P has no effect on other important manifestations of the scorbutic state—tissue hydration, anæmia, knee flexion, and general clinical condition.

The administration of vitamin P can produce an increased capillary resistance in the scorbutic subject either before or after treatment with ascorbic acid. The capillary resistance of such subjects is not controlled by the administration of ascorbic acid or of vitamins A, B_1 or D.

A deficiency of vitamin P may exist in man even when he has been taking large doses of ascorbic acid for prolonged periods. Its clinical manifestations include pains in the legs on exertion, pain across the shoulders, weakness, lassitude, and fatigue. It is invariably associated with a much-decreased capillary resistance and may be characterised by the development of spontaneous petechial hæmorrhages, especially in areas exposed to pressure. It has not been found to be

accompanied by any hæmatological abnormality. It responds to treatment with vitamin P. The precise chemical nature of the vitamin remains to be determined.

My thanks are due to Prof. D. M. Dunlop, in whose wards this work was carried out; to Sister Buchan, of the dietetic department of the Edinburgh Royal Infirmary, to whose care the success of the experiments is largely due; and to Mr. A. Crosbie for help with the capillary-resistance determinations.

The ascorbic acid and vitamin P used in these experiments were obtained through the courtesy of Mr. A. L. Bacharach, of Glaxo Laboratories Ltd. I am also indebted to Roche Products Ltd. for a gift of material.

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ACUTE IDIOPATHIC PORPHYRY

WITH REPORT OF A CASE

By Leo Rau, M.D. Berlin, M.R.C.P.

Idiopathic porphyry used to be called hæmatoporphyrinuria; the name is incorrect, because other porphyrins may also be present in the urine. The Hoppe-Seyler hæmatoporphyrin is a complex pigment produced outside the body in a test-tube by the action of strong sulphuric acid on hæmoglobin. Other porphyrins have in common the fact that they are found in similar clinical syndromes, which may be classified as follows:

1. Normal porphyry depending on absorption from food.
2. Congenital porphyry with photosensibility, skin lesions, and pink teeth.
3. Symptomatic porphyries, acute and chronic, which may be further subdivided into abdominal and nervous forms of acute idiopathic porphyry; and toxic porphyry occurring in disease of the liver (including toxic poisoning), blood diseases such as hypochromic and hyperchromic anæmias, chronic poisoning with sulphonal, trional, or sodium barbitone, acute poisoning with procaine, lead poisoning, sulphanilamide treatment, Korsakoff's syndrome, pellagra, and rheumatic and allergic diseases.

In all these cases the porphyrin may be found in the urine, fæces, bile, blood, and cerebrospinal fluid (C.S.F.). The clinical picture of acute lead colic is almost identical with that of a severe acute attack of idiopathic porphyry; moreover, some cases of acute lead poisoning present the typical symptoms and signs of acute peripheral neuritis and encephalopathy as observed in cases of acute idiopathic porphyry.

H. Fischer, Rimington [1] and others have investigated the chemical structures of all the known porphyrins and shown that they are iron-free hæmoglobin, but their physiology is still obscure. Bilirubin, another iron-free hæmoglobin, was found, in the case described below, immediately after the disappearance of the porphyrin from the urine; but whether the metabolism of these two iron-free hæmoglobins, porphyrin and bilirubin, is related is also unknown. Many of the acute toxic porphyries and their complications disappear or improve gradually on treatment by injections of liver extracts or with vitamin B_1 or with vitamin B_2 complex. The porphyrin appears to have a selective action on the nerves. In the following case of acute idiopathic porphyry the diagnosis was made by recognising the excreted uroporphyrin by direct spectroscopy and by the fluorescent method under the Wood filter with ultraviolet rays.

CASE-REPORT

An unmarried woman aged 30, while in a cinema on March 25, suddenly felt giddy and had a bad headache and nausea but did not vomit. It was the first day of a menstrual period Her temperature that night was 103° F., pulse-rate 70–80 The symptoms persisted and got worse at times, but there was no vomiting and no abdominal pain. She was constipated.

Past history.—No contact with lead could be recalled, nor had any drugs been taken. No abnormal colour of the urine had been noticed. The periods had always been normal and regular. There had been no pigmentation or sensibility to light. The weight had varied between 8 st. 11 lb. and 9 st. 13 lb. She had never had jaundice, the spleen had never been found enlarged. She had no allergic disease. When in Switzerland as a teacher, aged 22, she felt very easily exhausted, had no appetite, suffered from indigestion, and often felt sick; she was told she was run down. At 25 she was again run down, had pain after eating, and felt sick; tired easily. Radiography of her stomach did not reveal any abnormality. At 28 she was again run down, this time with bad backache; her spine was radiographed at the time and found to be normal.

Family history.—Two sisters and one brother in good health. As far as could be ascertained there has never been any suggestion of familial illness. There is no consanguinity in the parents.

Progress.—She was examined on March 27. Temperature 103° F., pulse-rate 72, blood-pressure 140/85. The patient appeared very ill and toxic, there was cyanosis of the lips and pinkish jaundice of the skin. The pupils reacted to light and accommodation, the fundi and ocular movements were normal. The tongue was furred and moist. Lungs clear; heart not enlarged, sounds normal. Abdomen soft; spleen and liver were felt. Central nervous system normal. There had been insomnia, not relieved by Veganin or phenobarbitone gr. 2.

On the 28th patient felt much easier. Spleen and liver again palpable. Central nervous system: fundi clear, ocular movements and pupils normal, no nystagmus, plantar reflexes flexor, abdominals absent; ankle and knee, triceps, biceps and supinator jerks absent on both sides. No disturbance of sensibility, but severe muscular pain and deep muscular tenderness. No ataxia; motor power normal; no tremor. This day the peculiar dark brown colour of the urine was noticed, suggesting the passage of melanin or of methæmoglobin.

On the 29th she was much worse with severe headache and nausea. Temperature 103° F., pulse-rate 70; tongue dirty, moist, and furred. Neither spleen nor liver felt. Urine: dark brown; reaction acid, albumin +. No crystalline deposit. No bilirubin; uroporphyrin + + + (demonstrated spectroscopically). Later in the day the patient became restless and semi-stuporose and was only able to answer questions after some delay. Temperature 103° F., pulse-rate 88, respiration-rate 24. Still complained of sleeplessness. Much rigidity of neck, but neither Kernig's nor Brudzinski's sign present. Reflexes as on previous day. Constipated since the 25th in spite of several enemata. Great difficulty in micturition but no loss of sphincter control.

During the next two days she had pain, tenderness, and rigidity in the cervical spine. She vomited several times. Urine: dark brown. Urobilinogen (Ehrlich) +, urobilin —, uroporphyrin + +. No deposit. On April 1 the physical signs were unchanged, but in the evening the jerks of left upper limb were present. Lumbar puncture showed no abnormality. By the 3rd both knee-jerks were present, otherwise no change. Complained of headache and abdominal pain. Next day there was improvement. Knee, ankle, and upper limb jerks present, plantars flexor, abdominals still absent. Hardly any rigidity left in cervical spine. Liver and spleen not felt. On the 5th urine was lighter in colour, uroporphyrin still present, bilirubin + +, urobilinogen + + + (cold test). On the 6th there was slight loss of blood per vaginam. Urine: uroporphyrin negative, bilirubin + +, urobilinogen +, urobilin —.

By April 7 the urine was almost normal in colour; albumin —, urobilinogen —, bilirubin +, urobilin positive on spectroscopic examination and to Schlesinger's reagent. The pinkish jaundice was disappearing, especially on the abdomen and on the extensor sides of upper limbs. Petechiæ on both shins. Headache still present; transient diplopia. Abdominal reflexes still missing, all others present and normal. By the 8th the urine was normal in colour; bilirubin —, urobilinogen —, urobilin + +. She felt much easier and much stronger. Only traces of pink jaundice on

1. Rimington, C. *Proc. R. Soc. Med.* 1939, **32**, 1268.

flexor side of upper limbs. No muscular tenderness. Diplopia had disappeared. She made a complete recovery, but all abdominal reflexes were absent till about April 18. From April 8 to 18 there were choreiform movements of the limbs.

Laboratory investigations.—Wassermann and Kahn tests in blood and C.S.F. gave negative reactions; agglutination for typhoid, paratyphoid A and B, and for *Brucella abortus* were negative in blood; radiogram of chest and heart, no abnormality seen; C.S.F., on April 1: cells, less than 2 per c.mm.; protein, 35 mg. per 100 c.cm.; globulin test, negative; chlorides, 720 mg. per 100 c.cm.; sugar, within normal limits; culture, sterile. No further examinations of blood or fæces were carried out.

Treatment.—M. & B. 693, 10 g., was given by mouth for 72 hours after porphyrinuria had been proved. The temperature quickly became normal, but neither the porphyry nor its clinical syndrome was influenced. The patient was also given Anahæmin, insulin, and glucose by subcutaneous injection and alkalis per rectum. But it is doubtful whether the result was due to this treatment, because spontaneous cures have been recorded. The insomnia was treated at first with phenobarbitone gr. 2 without any effect, but later the patient was given morphine gr. ¼ by hypodermic injection with success. After the acute stage had passed, she was given vitamin B_1 by mouth and by hypodermic injection, and hypodermic injections of strychnine hydrobromide gr. $\frac{1}{30}$.

DISCUSSION

There is no reason to believe that in this patient the porphyry was caused by any drug or toxin. No previous allergic or rheumatic illness was reported. Lastly, the porphyry could not have been due to food, because the porphyrinuria increased when she was almost stuporose and taking only fluids. She evidently had an acute attack of idiopathic porphyry; whether it was the first attack is not known, although it is likely that the previous attacks of "being run down," with indigestion and severe backache, were manifestations of the same illness. Porphyry is only one of the symptoms of the condition; other features of the attack in this patient were the association of the onset with the menstrual cycle, the obstinate constipation, backache, and the nervous symptoms, especially the acute peripheral polyneuritis which became apparent on the fourth day. The symptoms are not always typical; in any case showing acute abdominal pain, constipation, dysuria, vomiting, and signs of spastic ileus, with or without the presence of a dark brown or red urine, we must always think of acute idiopathic porphyry and try to establish its diagnosis by simple tests of the urine, of which the following are examples:—

(1) Examination of the colour of the urine, which may be deceptive. A normally coloured urine may contain porphyrin, and a dark urine may show bilirubin, melanin, hæmoglobin, or tyrosine and leucin crystals in the deposit. Or the fresh urine may be normal in colour and may show the peculiar dark brown or red colour only on standing. The change may be hastened by boiling the urine in acid solution. In the presence of porphyrin the urine will turn almost black, owing to the transformation of the chromogen to porphyrin.

(2) Aldehyde-reaction (Ehrlich's reagent for urobilinogen). If the test is negative, the presence of porphyrin is unlikely; if positive, examine for urobilin spectroscopically and chemically with Schlesinger's reagent. If urobilin is absent the presence of porphyrin can be presumed.

(3) Direct spectroscopy.

(4) Spectroscopy and examination of acetic-acid-ether extracts of the urine for red fluorescence under Wood's filter with ultraviolet rays.

(5) Waldenstroem's test (urochlor reaction). Add 2 c.cm. of concentrated hydrochloric acid to 1 c.cm. of urine; in the presence of porphyrin the urine will be purple. Now add one drop of a fresh 3% solution of hydrogen peroxide. In the presence of porphyrin the colour will change to yellow, after this slowly to a strong green, and then disappear. According to Waldenstroem, this test is as good and reliable as a spectroscopic test.

Other chemical tests and investigations for isolation and crystallisation of the porphyrins are of no interest to the clinician but are very important for the biochemist. Lastly, the clinician may sometimes be able to diagnose a case of porphyry from the rare but typical radiological appearances of the intestines, including complete atonia of one part of the gut associated with severe spasticity in another part; thus there may be dilatation of the stomach and duodenum accompanied by contraction of the jejunum and ileum and great dilatation of the colon.

The strong positive reaction to Ehrlich's aldehyde reagent was not due, in this case, to urobilinogen but to porphyrin or porphyrinogen. After the disappearance of the porphyrin from the urine the colour became normal, but the chemical tests showed for a few days considerable bilirubinuria and afterwards urobilinuria. This observation can only be explained as evidence of damage to the liver. Although, thanks to Fischer, the chemical structure of all porphyrins is known, their origin within the body is unexplained. Since porphyrins are found today after prolonged treatment with drugs of the sulphonamide group, it ought to be possible to throw more light on their origin.

SUMMARY

A case of acute idiopathic porphyry complicated by acute polyneuritis is described. The patient was treated with injections of liver extract, insulin, glucose, and alkalis, and recovered completely from the polyneuritis. The occurrence of the porphyries, their significance and diagnostic importance are discussed.

My thanks are due to Sir Maurice Cassidy and Dr. Gordon Holmes, who saw this patient in consultation with me and confirmed the diagnosis.

TREATMENT OF SPLENOMEGALY BY ASCOLI'S METHOD

By R. W. Stephenson, M.R.C.S.
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Ascoli[1] has claimed success in the treatment of splenomegaly in chronic malaria by intravenous injections of adrenaline. This has been confirmed by other workers, and claims have been made that it is efficacious in splenomegaly from other causes. Injections are given daily, starting with 0·01 mg., and increasing until a dose of 0·05 mg. is reached on the ninth day. This dosage is then continued for a further twenty days.

A series of 18 cases were treated, in all of which the spleen was enormous, extending down to or in some well below the umbilicus. Chronic malaria was the cause in 11 cases; they gave the usual history of frequent attacks of "fever" spread over a long period, and all showed considerable anæmia and debility; in only 4 cases were parasites found in the blood. Of the remaining 7 cases no cause for the splenomegaly could be found in 3, though it was thought not to be due to malaria; 3 were cases of kala azar and 1 of bilharzia.

The 11 malaria cases were given a ten-day course of quinine bisulphate, followed by a five-day course of Plasmoquine and an iron and arsenic mixture, with no effect on the size of the spleen and little on the general condition. They were then given Ascoli's treatment and during the time they were receiving this all other treatment was stopped. In 9 of them by the end of the course the spleen either was not palpable or could just be felt below the costal margin, and there was considerable improvement in their general condition and a gain in weight. Of the 9 who improved 2 did not complete the full course; one developed giddiness, breathlessness and precordial pain immediately after the nineteenth injection, and these symptoms increased in severity after each subsequent injection so that the course was stopped after the twenty-second; the other showed similar symptoms after the twenty-first injection, and treatment had to be stopped two days later. In 2 cases (one of which was complicated by mitral stenosis) the treatment was unsuccessful; there was little or no alteration in the size of the spleen, though there was slight improvement in the general condition.

The 3 cases in which no cause of splenomegaly could be discovered were given no preliminary treatment and none of them showed any decrease in the size of the spleen at the end of the course of adrenaline. The 3 cases

1. Ascoli, M. *Pr. méd.* 1937, **45**, 1827.

of kala azar had all previously received a course of Neostibosan and of antimony tartrate or Anthiomaline, which had greatly improved their general condition but had not reduced the size of the spleen. In 2 of them adrenaline treatment made no difference, but in the third, who was given anthiomaline concurrently, a slight reduction was noted. The single case of *Bilharzia mansoni* infection had previously received antimony treatment which had cured his bilharzia but had not reduced the size of the spleen; his splenomegaly remained unaffected by adrenaline.

FISTULA OF THE PENILE URETHRA AFTER GUNSHOT WOUND

By G. Grey Turner, LL.D. Glasg., D.Ch. Durh., F.R.C.S.

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Fistula of the penile urethra is notoriously difficult to cure, although this point is not emphasised in textbooks. The accompanying figure depicts an example which came under my care in the year 1919.

CASE-RECORD

The patient was a not very robust young pensioner who had been discharged from the Army, the fistula being the sequel to a gunshot wound sustained three years before he came under my care. The opening into the urethra was situated just in front of the scrotum and would admit the end of a lead pencil; the margins were thickened and rolled, and the epithelia of the skin and the urethra were united. There was no stricture, but about half the urine escaped through the fistula during micturition. Four operations had been carried out—three of them under the guidance of Professor Rutherford Morison. Feeling that something more than ordinary repair must be attempted, I adopted the following procedure:—

A median incision was made along the under surface of the penis and round the fistula. The skin and the urethra were thoroughly separated. By using a skin flap cut from one side of the ellipse left round the fistula, using it as a lid turned back over the hole in the urethra, with the skin surface towards the lumen of the latter, and suturing it in position I was able to close the hole in the urethra without narrowing its lumen.

This interference, after the plan of Diffenbach, might alone have been sufficient; but, previous operations on these lines having been unsuccessful, I felt that I must reinforce the union to achieve success. The skin was therefore dissected up to the extent of about ½ in. all round the fistula, and the resulting bared area was covered with a free flap of fascia about 1½ in. long by ¾ in. broad cut from the outer side of the thigh. This was closely sutured over the repaired area of the urethra, and the skin was then carefully drawn together and sutured over the supporting fascia. Fine catgut was used for all sutures. At the same time a catheter drain was introduced into the bladder through a separate incision in the perineal urethra and was kept in situ for a fortnight.

The patient made a complete recovery. There was never any leakage from the urethra or suggestion of subsequent stricture, and seven months after the operation I passed a No. 10 rubber catheter without the slightest difficulty. I saw the patient from time to time, and seven years later the parts were perfectly normal, and there had been no trouble and no symptoms suggesting narrowing.

In dealing with the penile urethra I am sure that the diversion of the urine is an important step, but I also urge that the support of the fascial graft, as used in this case, was probably of considerable value.

COMMENTS

Urethral fistulæ resulting from gunshot wounds may be difficult to deal with, but their management must be conducted not as a special problem but in conformity with general surgical principles.[1] The crux of the problem is whether or not the whole urethra has been divided. When that has happened, the ends will have retracted, and the gap will be occupied by a mass of scar tissue, the fistula being situated just posteriorly.

There ought to be little difficulty in excising any moderate mass of scar tissue together with the fistula and getting the ends of the urethra together even with a gap of 1–1½ in. With the bigger gaps it will be necessary to mobilise the urethral ends, freely separating the corpus spongiosium (corpus cavernosium urethræ) from its bed. When the ends are brought together they should be approximated with only a few sutures of fine chromised catgut, which should take a good hold of the periurethral tissues without entering the lumen of the canal. In the perineal urethra only the roof and sides should be sutured, the floor being left open to ensure a bigger lumen. In the penile urethra—i.e., in front of the scrotum—sutures, should be placed all round the urethra, because the fistula tends to re-form.

The urine should always be diverted during the process of healing; a median perineal section is the best means of bringing this about. An indwelling catheter is certainly not ideal, because it encourages a mild inflammation of the mucosa near the urethral wound, and the resulting infection attacks the sutured area and leads to the formation of scar tissue. The perineal drain should be removed at the end of ten days, after which, the urethra being patent, the perineal wound and remains of the fistula may be expected to heal.

Fistula of penile urethra caused by gunshot wound.

Where large sections of the urethra have been destroyed, the question of the formation of a new tube by plastic methods or by the substitution of some other structure to form a urethra will arise.

When the continuity of the urethra has not been interrupted but there is a fistula to the surface, the problems that arise again depend on its situation. In the perineum it is probably enough to excise the skin margins of the fistula down to the urethra and to provide for diversion of the urine by proximal drainage. In the penile urethra it is traditional that difficulties arise, and at least one method of surmounting them has been detailed here.

1. Turner, G. G. *Lancet*, 1923, **2**, 82.

University of Sheffield.—The following external examiners have been appointed in the faculty of medicine: anatomy, Prof. R. D. Lockhart; physiology, Prof. R. J. S. McDowall; medicine and therapeutics, Prof. L. G. Parsons; surgery, Mr. E. Rock Carling; pharmacology, Prof. W. J. Dilling; obstetrics and gynæcology, Prof. A. L. Robinson; forensic medicine, Prof. Sydney Smith; public health, Dr. J. A. Charles; and dental subjects, Mr. J. P. Cocker, L.D.S.

The committee of management of the Sheffield Hospitals Council (Inc.) will include the junior pro-chancellor, the vice-chancellor, Prof. H. N. Green, M.D., Mr. Albert Harland and Prof. E. J. Wayne, F.R.C.P.

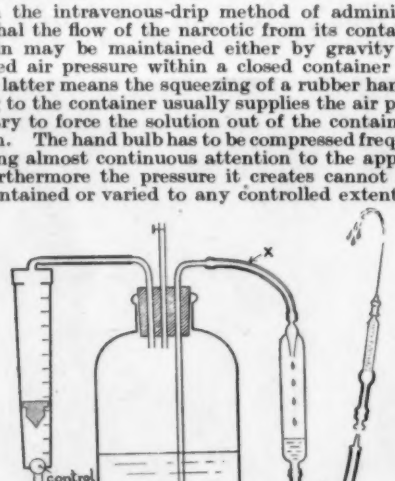
APPARATUS FOR GIVING INTRAVENOUS ANÆSTHETICS CONTINUOUSLY

By R. R. Macintosh, D.M. Oxfd, D.A.; and
E. A. Pask, M.B. Camb., D.A.

(*From the Department of Anæsthetics, University of Oxford*)

The usual method of using a barbiturate as the sole anæsthetic for more or less prolonged anæsthesia is to give one or more additional mass injection whenever the patient appears to be overcoming the narcotic effect of the first. This procedure cannot be regarded as satisfactory, on account of the lack of constancy in the depth of anæsthesia. A more suitable method is to give a continuous drip injection of the narcotic solution, varying the rate of drip in accordance with the patient's condition and the depth of anæsthesia required.

With the intravenous-drip method of administering Pentothal the flow of the narcotic from its container to the vein may be maintained either by gravity or by increased air pressure within a closed container bottle. By the latter means the squeezing of a rubber hand bulb leading to the container usually supplies the air pressure necessary to force the solution out of the container into the vein. The hand bulb has to be compressed frequently, requiring almost continuous attention to the apparatus, and furthermore the pressure it creates cannot readily be maintained or varied to any controlled extent. The



following is a method which we have devised for replacing the hand bulb by oxygen under pressure from an ordinary cylinder of the gas.

A pressure-reducing valve and a control tap are essential; but the flowmeter illustrated is only a refinement. The oxygen is led into the top of the closed bottle containing the narcotic solution. From the bottom of the solution a glass tube leads through the cork of the container into a length of rubber tubing (X–X′) interrupted by a glass dropper, through which the rate of drip of the solution may be observed; distally the rubber tubing ends in a male union. The needle fits on to a glass "window," the other end of which is attached to a short length of rubber tubing and a female union. After the tube X–X′ has been filled with narcotic solution the needle is inserted into the vein. As soon as blood is seen in the window the male and female unions are connected and the needle strapped in position with adhesive plaster. The control tap is turned on, and the oxygen released from the cylinder forces the narcotic solution through the outlet tube into the sight dropper, and thence to the vein. The rate of flow is now subject to finger control. The middle tube leading into the container is fitted with a tap and can be used if necessary to dissipate any excess pressure.

The entry of a given amount of oxygen into the container bottle does not force out exactly the same amount of narcotic solution, since within the container the oxygen is compressed again to some extent, and slight leaks may occur. The variable flow of the solution through the Vacoliter sightdrip is a definite indication of the amount of anæsthetic being given at any time, and its control by the amount of oxygen released from the cylinder is a simple method of maintaining a constant level of anæsthesia, or of deepening it. If a precise measure of the amount of narcotic solution that has entered the vein is required the container bottle may be calibrated in c.cm., and the lowering of the solution level noted from time to time.

Although this method simplifies control of the rate of injection of any fluid it is obviously necessary to prevent the container-bottle becoming empty while the needle is still in the vein, since in that event a dangerously large amount of oxygen may easily be forced rapidly into the vein, causing a gas embolus.

ACUTE FATAL HYPERPARATHYROIDISM

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ASSISTANT PATHOLOGIST TO THE INFIRMARY

Records of acute poisoning by parathyroid hormone in man are few. The following case is apparently the fifth to be confirmed by necropsy. The reaction is known in experimental animals, death occurring in a few days with tissue necrosis and diffuse calcinosis. Oliver (1939) described two cases (women, aged 57 and 56 years), and reviewed the three previously recorded—by Dawson and Struthers in 1923 (a man of 49), Lowenburg and Ginsburg in 1932 (a boy of 5), and Hanes in 1939 (a woman of 49). The second of these three cases was the only one to recover; in this boy the excess of extract was not produced by an overacting endocrine gland, but had been given therapeutically in mistaken dosage.

CASE-RECORD

A woman, aged 44, was admitted to Preston Royal Infirmary on Aug. 8, 1939. She had been married 17 years; her only child, born a year later, died of bronchopneumonia at 13 months. Her health had been good until 1937, when she had attacks of rheumatism in one hand, and dizziness. A limp developed, and the thighs became slightly bowed. Pain in the legs became severe and was unrelieved by treatment. There was some constipation. In July, 1939, she was in bed with rheumatism. The sequence of events leading to the fatal crisis can best be seen in the following diary.

Progress.—Aug. 8, 1939. Admitted 11.30 P.M. with history of abdominal pain, vomiting and constipation, but slept comfortably until morning. Enemata were effective next day, and for the next six days and nights the patient, although constipated, was comfortable and without complaint. A catheter specimen of urine was acid, specific gravity 1012, and contained a little albumin, with a few erythrocytes and leucocytes in the spun deposit.

17th. Radiograms of gastro-intestinal tract showed no abnormality.

18–20th. Some frequency of micturition.

21st. Mild attack of abdominal pain and vomiting, which passed on the bowels being moved, but left some tenderness.

22nd. Drowsiness; incontinence of urine and fæces.

23rd. Cerebrospinal fluid normal as regards appearance, cell-count, globulin, protein and chloride content, gold curve and Wassermann reaction. Delirious at night, pulse-rate 132, respirations 64 per min.

24th. Conscious but critically ill. Nausea, dry skin, furred tongue, distended tender abdomen. 10.30 A.M. blood taken for count (normal) and chemistry (sugar 85 mg. per 100 c.cm., urea 155 mg., and calcium 23 mg.). Death at 2·5 P.M.

Necropsy.—An hour and a half after death. Slim woman with moderate outward bowing of thighs; skull purple and soft, but of normal size. Thyroid gland normal; at lower pole of right lobe and behind right sterno-clavicular joint is a firm, smooth, encapsuled, ovoid yellow tumour of parathyroid gland, 25 × 20 × 20 mm. in size and weighing 7 g.; cut surface homogeneous except for a few minute areas of colloid.

Old adhesions over upper lobe of each lung; lower lobe of right lung (400 g.) congested; left lung 280 g. Heart small (250 g.) with dilated right side; coronary arteries healthy. Scattered flecks of necrosis of subperitoneal fat near stomach and pancreas, which latter is swollen, and, in its right half, grey and necrotic; weight 200 g. Kidneys, left 240 g., right 300 g. Very swollen, with deeply congested, hæmorrhagic cut surface; capsules strip readily. Parts of right iliac bone sampled and found soft; one small cystic area exposed. Right femur excised and split; thin ring of shaft; extension and hyperæmia of medulla; one medullary "cyst." Other organs normal to naked eye. Radiological examination of removed kidneys showed no macroscopic deposits of calcium.

Histology.—Sections in paraffin were made from parathyroid tumour, heart, lung, liver, spleen, adrenal gland, kidneys, pancreas, uterus, stomach, ileum, colon, pituitary gland, parietal bone, iliac bone and femur, and stained by hæmalum and eosin and with van Gieson's stain. The parathyroid tumour is an adenoma of chief cells. The parietal bone shows osteoporosis and osteitis fibrosa. The iliac bone and femur show osteitis fibrosa cystica. The kidneys show very abnormal features: early thrombosis in some of the veins of the pelvis, and at the junction of cortex and medulla; thrombosis of a few smaller arterioles and capillaries, the walls of some of which show early necrosis; intense general engorgement and a few interstitial hæmorrhages; focal cloudy swelling and necrosis of tubular epithelium; in the lumina of tubules are cellular remnants, albuminous casts, erythrocytes and a few polynuclear cells; distension and loculation of glomerular spaces with exudate; adhesion of tufts to capsule; hyaline degeneration, shrinkage and atrophy of tufts. Widespread calcinosis, mainly in tubular epithelium and basement membranes, much in interstices, a little in some glomerular tufts and the walls of a few small arterioles and capillaries. Evidence of chronic renal damage is absent. Pancreas shows early venous thrombosis, block necrosis of gland and interstices, with finely divided and widespread calcinosis; slight inflammatory reaction of lymphocytes and polynuclear cells. Sections of other viscera are normal.

DISCUSSION

We suggest that death was due to an acute crisis supervening upon chronic hyperparathyroidism. The state of the kidneys is that classified by Allbright and his collaborators (1934) as type 3 of the effects of parathormone, an acute effect, the case "making a rapid exit—chemical death as it were—without chronic lesions in the kidneys." This renal state is also described by Chown et al. (1939) in acute parathormone poisoning of rats, after as little as 48 hours, and also by Duguid (1933–34) in the acute phase of phosphate "nephritis" in rats. Duguid found that, if acid phosphates alone were given in excess or continuously, without excess of vitamin D, in contrast to alkaline phosphates, they produced this necrotic type of tubular "nephritis," as an early stage of fibrotic and vascular "nephritis." Reference to the previous reports shows the similarity of the critical symptoms in them and in the present case. In this one, however, the illness was apyrexial throughout; the kidneys and pancreas bore the brunt of the necrosis and calcinosis; and the vascular thrombosis in these organs is a striking feature. The pancreatic lesions probably explain the abdominal pain, and raise the possibility of confusion with acute hæmorrhagic pancreatitis.

SUMMARY

A woman, aged 44, with chronic hyperparathyroidism and osteitis fibrosa, died in the second of two crises of acute hyperparathyroidism, with acute necrosis and calcinosis in kidneys and pancreas.

Our thanks are expressed to Mr. A. Toulmin and Dr. W. A. Simpson for access to the patient and case-notes, and to Mr. R. Spivey for his interest and skill in histology.

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Medical Societies

ROYAL SOCIETY OF MEDICINE

SECTION OF ODONTOLOGY

AT a meeting of this section on Oct. 28 Mr. EVELYN SPRAWSON gave his presidential address on some

Forensic Aspects of the Teeth and Jaws

Several years ago, he said, he had set a question in a dental surgery paper which no candidate attempted; it asked what deductions might be made concerning the age, habits and life-history of the individual from the study of the teeth and jaws. In examining the evidence on which a reply might have been based, he pointed out that age may be assessed with relative accuracy, chiefly from the teeth and to a less extent from the jaws. The dates of calcification, eruption and absorption of deciduous teeth are useful: the first permanent molar may erupt between 4½ and 7½ years. Isolated deciduous teeth, especially molars, may be unreliable evidence of age; occasionally they have no permanent successors, and though, in that case, their roots usually become absorbed, such absorption is delayed and may not occur at all. Rate of wear will also vary according to the physical characters of food and functional activity, this latter depending in turn upon such factors as general health and the degree of occlusal perfection and the health of the individual. Deciduous teeth show wear more readily than do permanent teeth. Disease may accelerate or delay the eruption of teeth and occasionally one or more deciduous teeth may be erupted at birth. As to the jaws, the degree of growth, closure of sutures, the mandibular angle and causes affecting it, and finally the presence or absence of tooth sockets or crypts all may afford evidence of age. Radiographic examination is essential. Disease in childhood may sometimes give useful evidence. The green teeth of icterus gravis neonatorum and the pink teeth of congenital hæmatoporphyrinuria are examples. The former must not be confused with teeth stained green from lack of care of the mouth; here the stain is superficial and its distribution different. The pink teeth of hæmatoporphyrinuria must be distinguished from those discoloured by blood extravasation from the tooth pulps in death by strangulation; this extravasation depends in turn on dentinal tubule patency, itself governed by age and attrition. Hypoplasia of the deciduous teeth is evidence of deficiency in the maternal diet; and of the permanent teeth, if transverse and linear, indicates acute short illness at the time of calcification. The trophic hypoplasia of malnutrition, probably rachitic, of canines, incisors and first molars is less common now than formerly, but it must be distinguished both from hereditary hypoplasia (said to exempt third molars) and from that due to local trauma and suppuration. Congenital syphilitic stigmata, though not always present, are pathognomonic when found; evidence that the deciduous teeth may be so affected is unsatisfactory. Caries of the incisal edges of the anterior teeth has several times been recorded as syphilitic in origin, but it is generally believed that if the infecting agent is active when this part of these teeth is calcifying the pregnancy usually aborts.

Bones do not tell us much; necrosis during the acute stage of scarlet fever or measles may result in the loss of tooth germs in the sequestrum, but absence from other causes is too common to make this evidence of much value. Clefts, and the dental abnormalities associated with them, and the spacing of teeth may give evidence of identity. The breast-fed child has wide jaws and a flattened palate. About the age of 6 the anterior teeth are well spaced and no longer in lateral contact; ultimately there is more room for the permanent teeth. Heredity does not tell us much; hereditary hypoplasia is rare; congenital absence or excess of teeth may be difficult to prove though X-ray evidence before the normal date of eruption of a tooth may show that it is absent from the jaw. Hereditary variations of the bones and jaws are not common and may be masked by orthodontic treatment. The size of the teeth is not helpful; with one exception all cases of exceptionally large teeth he had seen in British mouths had been in males, though

there are racial differences in the size of teeth, of course, and the measurements of teeth of the micro-, meso-, and megadont races run almost parallel to those of the gnathic index.

In a few cases evidence of habits and occupation may be present, as in the special attrition of maxillary incisors in boot lasters, and abrasion in clay-pipe smokers—both of which marks indicate sex in this country at least; similarly the small jagged notches in maxillary incisors caused by biting cotton thread are usually a sex mark. Erosion cavities tell us that the patient takes some care of his teeth, that he scrubs too hard or uses too stiff a brush or too abrasive a dentifrice or brushes the wrong way. The position of the teeth most abraded indicates whether the individual is right- or left-handed. The rampant caries of the baker or confectioner is of value, though rampant caries is apt to occur in others; he had once, he said, seen a professional chocolate taster who had cervical caries on every tooth in an otherwise almost complete dentition. Similar caries has been noted in young employees in sulphuric and tartaric acid chemical factories. The smoker's salivary calculus will be stained dark brown, especially on the lingual side of the mandibular incisor teeth, and the strong tea drinker will often have black stained dentures. These two items also to some extent indicate sex. The blue line of Grisolle along the gum margins, caused by chronic lead poisoning, depends on the presence of teeth and on some degree of gingival infection; it must not be confused with the browner line produced by the bismuth of antisyphilitic treatment, nor with subgingival calculus, nor with carbon deposit. Tribal marks in primitive races are sometimes made by filing away parts of maxillary incisors; the wide arches of Eskimos afford some indication of sex, being greater in the ladies whose duty it is to render pliable the sealskins for clothing by chewing them. Caries generally preponderates in civilised races and its conservative treatment should indicate a higher degree of civilisation. Absence of caries in early life may indicate a good diet rather than conservative care; rampant caries indicates the absence of both. In the young, gingivitis is an indication of mouth-breathing, caused by nasal obstruction, and the habit and its results may remain permanently even after nasal patency has been established. General gingivitis, and its frequent sequel of parodontal disease, may indicate the character of the diet and the amount of care taken of the teeth and so perhaps be some guide to social status. The character of conservative work at present also indicates social status and perhaps nationality. He admitted professional shame at the travesty of dentistry at present provided for civilian war casualties. Old fractures leave scars and the same applies to loss of tissue from teeth, whether from trauma, attrition or caries. A man's teeth are as individual as his finger-prints, though less permanent; but when present they may tell more of his life-history. Evidence of the kind discussed has established identity in Australia, the United States and, he believed, in this country.

Reviews of Books

Sulfanilamide, Sulfapyridine and Allied Compounds in Infections

By MAURICE A. SCHNITKER, M.D., attending physician, Toledo Hospital. London: Humphrey Milford, Oxford University Press. Pp. 72. 8s. 6d.

REPRINTED from the Oxford Loose Leaf Medicine, this little book fairly summarises the American outlook on present-day chemotherapy. The chapter on the sulphanilamides is the best, though the description of 8-hourly intrathecal injections for meningitis would have been better omitted; that on sulphapyridine contains many errors, and there is no mention of sulphathiazole. The extensive bibliography of 202 names is not of great use to British physicians since most of the references will be unobtainable here; only 33 are British. The original clinical work on sulphapyridine and the treatment of methæmoglobinæmia by methylene blue, both published in THE LANCET, are two notable omissions in an otherwise full bibliography. Details of pharmacology and biochemical assay are unnecessarily full in a book intended "to assist physicians in their daily problems" In his final paragraph the author states that "the greatest care must be exercised in the use of all these drugs and treatment must be controlled by frequent determinations of blood and urine sulphanilamide content and their use must therefore be in the hands of those who have facilities for such determinations." If this were true, then the details of assay described might be justified, but the practice of chemotherapy would be very limited.

Infant Feeding

By ALAN MONCRIEFF, M.D. Lond., F.R.C.P., physician to the children's department at the Middlesex Hospital, and to outpatients at the Hospital for Sick Children, Great Ormond Street. London: Edward Arnold and Co. Pp. 31. 1s. 6d.

THIS little brochure deals with the management of the feeding of infants from birth up till three years, a subject difficult both to teach and to practise. Dr. Moncrieff has had much experience of the problem both as a teacher and a practiser, and in giving his instructions his aim is to reduce the problem to its simplest terms and present it in the fewest words. The trouble is that while we know a great deal about the chemistry of human and cow's milks we do not know nearly enough about the physiological processes of its digestion by the baby, or about the numerous disturbances of digestion that occur. Meantime clinical experience is the main guide to success in practice; and Dr. Moncrieff sets out to give the sound nursery lore on the subject, based on a few fundamental principles. In the opening pages he makes a short and simple statement of these principles, and he then proceeds to apply them to the management of breast-feeding, cow's-milk feeding (liquid, condensed and dried), complementary, supplementary and mixed feeding, and the special feeding of the premature baby. All this is done with the minimum of chemical terms and without mentioning the word calories. Certain risks go with this method of condensation—over-simplification, and the omission of practical difficulties—and the section on breast-feeding might have been enlarged with advantage. But if this carefully written book is as carefully studied the pupil nurse or the medical student will be fitted to begin the practice of infant feeding. If difficulties arise they will have to use their self-reliance and common sense as they are again and again urged to do in these pages.

Illustrative Electrocardiography

(2nd ed.) By J. BURSTEIN, A.B., M.D., associate electrocardiographer and chief of the cardiac clinic, Morrisania City Hospital, New York. London: D. Appleton-Century Co. Pp. 292. 25s.

INFORMATION derived from the use of chest leads has given fresh impetus to the study of electrocardiography. The second edition of Dr. Burstein's manual includes a chapter on these leads in which the changes of chief clinical value are summarised, especially those of cardiac infarction. Unfortunately the large number of chest leads which have been used complicates this new aspect of cardiography and further observations are needed to define more precisely the value of the different leads. For the present those new to the subject should content themselves with studying the one recommended for routine use, that is the apical lead. In other sections of the book the normal cardiogram and the commoner abnormalities are illustrated by curves from the ordinary limb leads. The simple style of writing and the limitation of the text to explanation of the illustrations make the book well adapted to the needs of beginners, but it is sufficiently comprehensive to be of use also to the advanced student.

Dr. Ninian Falkiner has been elected master of the Rotunda Hospital in succession to Dr. A. H. Davidson, whose term of office had expired. Dr. Falkiner is a graduate of the University of Dublin, and a fellow of the Royal College of Physicians of Ireland and of the Royal College of Obstetricians and Gynæcologists; he has been for several years gynæcologist to the Royal City of Dublin Hospital. A number of the governors have presented to the hospital a portrait of Dr. Davidson, painted by Mr. D. O'Brien, P.R.H.A.

THE LANCET

LONDON: SATURDAY, NOVEMBER 23, 1940

FACING DISABILITY

A PERIPATETIC correspondent has raised an arguable point. A girl shorthand-typist, whose back was broken in a motor accident, received appropriate treatment in the course of which she was seen by two orthopædic surgeons. A laminectomy was performed but failed to relieve the pressure; and both surgeons formed the opinion that the patient would never walk again. On hearing their verdict she called in an osteopath, and is said now to believe that complete cure is at least possible. Our correspondent feels that it is wrong and harmful that the patient should be buoyed up with hopes which are doomed to ultimate disappointment, and he regrets that she should prefer the opinion of an osteopath to that of two orthopædic surgeons. There is no clear evidence that the osteopath implanted the false but comforting hope, and the fact that the patient sought the aid of osteopathy should not be allowed to confuse judgment. The issue is this: in what circumstances is a medical man justified in forcing a patient to face unpleasant facts? Clearly if a patient can derive no possible benefit from facing them there is no justification for thrusting them upon him. Nothing, for example, is gained by depressing the moribund; and it is legitimate to practise a benevolent deception if only because no-one can accurately measure or foresee the action and interaction of the many body fluids which are powerfully affected by the mental attitude. To ignore them is to neglect a possible ally; and to dishearten a patient by a gloomy prognosis (founded at best on knowledge which is incomplete and may even be misleading) is to rob him of a valuable defensive weapon. KINGSTON FOWLER, referring to tuberculosis, once said that the only certainty in making a prognosis was that it would inevitably prove to be wrong. The statement is less of an exaggeration than it ought to be, and applies beyond the limits of tuberculosis.

Our correspondent is willing that the moribund should be spared unpleasant facts, but believes that in the case of this girl the position is different. "So long as she looks forward to walking again," he writes, "she will never face life as a cripple." The truth is that she will never face life as a cripple until she has exhausted every hope of escape. She quite naturally resists the fact that she is permanently disabled. Only when she has faced this fact, says our correspondent, will she begin to re-plan her life. But how can she re-plan it? What can she do? He claims that "if she would face being carried in she might be able to do her shorthand and typing from a wheeled chair." But who will lift that chair into trains and buses so that she may reach her work? Who will open and shut doors for her at her office? Who, in short, will bother with her when there are plenty of other shorthand typists whose backs have not been broken? Permanent disablement usually means, for an earner, a lifetime of physical and economic dependence. Before insisting that she shall face that fact it seems only fair that most of us should face another. There is no provision for such cases as this, and the remaining faculties of this girl—and the hundreds of thousands like her—are wasted, simply for lack of an environment in which they could be used. We have evolved a great and in many respects admirable public-health machine, but it has defects; and probably the most serious is complete failure to recognise that the restoration of working capacity is useless in the absence of the opportunity to earn. A large measure of this girl's working capacity has been or can be restored, but what then? "She could do her shorthand and typing from a wheeled chair." Advice such as this is unpractical. The employer usually will not, cannot, bother with the disabled; they slow things up and they are not wanted. If we are foolish enough to continue to waste the working capacity of our innumerable disabled—whose numbers increase with every air-raid, with every accident in mine and factory—those who remain fit will have an almost insupportable burden to carry.

The remedy is real rehabilitation—the association of restored working capacity with the opportunity to earn. This is achieved at the village settlements of Papworth and Enham, which constitute probably the largest rehabilitation unit in this or any other country. A national rehabilitation board, on the lines already indicated in these columns,[1] could find means to avoid waste of the talents of the disabled by extending the village-settlement principle. Until we can offer such patients a reasonable hope of employment in an environment which will reduce their physical handicap to a minimum and increase their earning power to a maximum our curative work will be robbed of more than half its value. The achievements of Papworth and Enham, of Dame Agnes Hunt at Gobowen, and of other workers elsewhere, have demonstrated that comprehensive, large-scale rehabilitation is an essential part of modern medicine. Before we expect patients to face unpleasant facts we should ensure that they have the opportunity to re-plan their lives afterwards.

SUGAR

"Suck, Baby, suck, your Father says it's sugar!" is the legend of a cartoon[2] depicting Napoleon's infant son hopefully gnawing the end of a large sugar-beet. The sardonic exclamation is made by the child's nurse well within earshot of the great general; but Napoleon, impervious to the gibe, is sitting at a small table squeezing the juice of a sugar-beet into his tea. Napoleon set many unfortunate precedents, but he must be given credit for his pioneer work on behalf of the beet industry. His vision of a new order in Europe included the preliminary isolation of England and her dependencies by the formation of a self-sufficient continental block. By his embargo on British merchandise he automatically cut off his chief supplies of sugar, hence the revival of interest in the sugar content of *Beta vulgaris*, the sweet properties of which had been noted as early as 1590 by Olivier de Serres. After Waterloo the continent was again flooded with cheap cane-sugar, and interest in beet-sugar naturally wilted. Since 1815 the state of health of a continent subject to a manic-depressive psychosis has been accurately mirrored by the sugar-

1. *Lancet*, 1940, 1, 131.
2. Sugar. By Geoffrey Fairrie. Liverpool. 1925.

beet industry. Activity in the trade, especially if it is enjoying government subsidies, portends a maniacal exacerbation somewhere.

Intensive beet cultivation by the Germans has resulted in an annual output of only 2 tons of raw sugar per acre. Sugar-canes yield an average of 6 tons per acre, and as much as 15 tons has been produced. From the consumer's point of view, however, there is nothing to choose between the two products—first-grade refined beet-sugar is indistinguishable from cane-sugar similarly treated. The sulphitation bleaching process which is commonly used on the Continent is inferior to the methods of refining by means of animal charcoal, and this is probably the explanation of the belief that beet-sugar is less sweet than cane-sugar. The relative impurity of bleached sugar is indicated by the fact that it is unsuitable for making lump sugar. The sucrose content of cane-sugar and of beet-sugar, even in the "raw" state, is remarkably high—96% and 95%. In the process of refining a purity of 99·9% is attained, thus making sugar perhaps the purest of all foodstuffs in commerce. Even soft brown sugar contains as much as 96% of sucrose and a further 2% of uncrystallisable sugars. It is unlikely, therefore, that sugars of this quality will ever become the subject of heated controversies such as have raged over the different varieties of flour.

The process of producing sugar from its mother liquors is essentially one of crystallisation from supersaturated solutions. The last residue or final molasses yields a number of side-products of extraordinary variety, but prior to this it may be treated to give dark-coloured syrup known to the trade as "treacle," but not to be confused with black treacle. Golden syrup has a superior pedigree to either of these; it originates in the process of fractional crystallisation of the syrup of the original canes. Golden syrup contains nearly 80% of sugar compared with about 60% in treacle, but whereas in golden syrup the proportion of sucrose to uncrystallised sugars is 1 to 1·6, in treacle it is 3 to 1. Castor sugar and icing sugar are prepared from first-grade crystal or granulated sugar by passing it between grinding rollers.

The liquid glucose used by bakers and manufacturers of sweets, jellies and jams contains approximately 35% dextrose and 45% dextrin; solid glucose also used in baking and brewing contains about 75% dextrose and rather less than 10% dextrin. The pure dextrose used by the doctor for parenteral injection has a purity on a dry basis of 99·9%. Confectioners distinguish between "hard-grain" and "soft-grain" sugars. A sugar is soft-grained if it does not stand up to heat in the oven—for example, if when used in the form of "nibs" on buns it melts and runs down the bun before it is ready to be taken from the oven. Bakers generally consider that they get less soft-grain sugars from cane than from beet. They regard hard-grain sugar as the more satisfactory from the point of view of working, solubility and sweetness.

Sugar is a food, but when we buy it we expect value in terms of sweetness. The absolute measurement of sweetness is at present impossible, for the variables are many and uncontrollable, but the relative sweetness of pure sugars was determined with considerable accuracy in 1925 by workers in the University of Minnesota.[3] If the sweetness of sucrose is taken as 100 the figures for other well-known sugars are: lævulose, 173; dextrose, 74; maltose 32; galactose 32; lactose 16. The degree of sweetness of a sugar is, however, affected by the foods with which it is taken. Thus a dilute solution of sugar ceases to taste sweet in the presence of a small quantity of common salt. Mucilaginous foods, and fats such as cream, also diminish the sensitiveness of the taste buds for sweet-tasting substances, and the sweetness of jams and honey is modified by the presence of essential oils and other aromatic compounds derived from fruit and nuts.

PORPHYRINURIA

THE Greeks knew a certain coloured shellfish by the name πορφύρα, and their πορφύρεος λίθος was an Egyptian igneous rock in which red and white crystals are embedded in a fine red ground-mass. From πορφύρεος we derive, through the Latin purpureus, our "purple"; and we retain the word porphyry to designate a number of purple or other coloured rocks of the same crystal-and-matrix structure. In 1865 the name "porphyrin" was given by a German chemist HESSE,[4] to one of two pigments which he isolated from the bitter-tasting infusion of an Australian bark. Since then porphyrins have been found widely distributed in nature. The African plantain-eater (turacus) owes its bright red wing-colour to the copper compound of a porphyrin; porphyrins are obtainable from grass, malt, yeast, and some worms; certain bacteria synthesise them; and they are an important constituent of chlorophyll, cytochrome, catalase and hæmoglobin. Hæmoglobin consists of globin united with hæmatin; removal of iron from hæmatin, with little other alteration, yields protoporphyrin. The basis of this, as of all the porphyrins, is a somewhat complex but very stable ring structure in which four pyrrole nuclei are linked together through four intervening carbon atoms; another German chemist, HANS FISCHER, called it porphin, and synthesised it in 1929. A minute quantity of porphyrin is found in normal urine and at first sight this might be expected to originate simply from breaking down hæmoglobin. The chemists, however, will not allow this; they divide all the naturally occurring porphyrins into two series, I and III, according to the pattern in which certain ethyl and methyl groups are attached to the fundamental porphin ring (there are two other series, II and IV, of unnaturally occurring porphyrins). Series I porphyrins cannot be converted in vivo into series III compounds or vice versa, short of rupture and resynthesis of the ring. Hæmoglobin contains a series III porphyrin, but half of the normal trace of porphyrin in the urine is of series I; therefore it at least cannot be derived from the breakdown of hæmoglobin, and is more probably a by-product of the process by which hæmoglobin is built up in the body. The other half of the normal urinary porphyrin is of series III, and so could derive from hæmoglobin, although it is clear that the bulk of the hæmoglobin in its disintegration follows a totally different chemical path, beginning with rupture of its porphin ring and ending in bilirubin. There is still much to be learned about the

3. *Amer. J. Physiol.* 1925, **73**, 387 and 397; see *J. Amer. med. Ass.* 1925, **2**, 977.
4. *Annalen der Chemie und Pharmacie*, 1865–6, Suppl. 4, p. 40.

chemistry of hæmoglobin formation and destruction in the body.

Derangements of these processes are characterised by the appearance of abnormal amounts of porphyrin in the urine, usually enough to give it a brown, red or portwine colour when passed, or after standing for some hours. Delicate spectroscopic examination is needed to identify the pigment. Porphyrinuria may be classified clinically under three headings. There is, first, porphyrinuria due to drugs, such as sulphonal, trional, amidopyrin, phenacetin, phenazone and the whole sulphanilamide series. It occurs significantly only when they are given in toxic doses, or to sensitive subjects, and the porphyrinuria runs parallel with methæmoglobin production in the blood.[5] The porphyrin found is mostly of series III, though FISCHER reported it as of series I; it is therefore probably derived from hæmoglobin, via methæmoglobin. Along with the porphyrin excretion there are sometimes dramatic symptoms similar to those of the second clinical group, which is called idiopathic porphyrinuria. It is an example of this condition, hitherto rarely reported in this country but long known in Germany and not uncommon in Sweden,[6] that Dr. LEO RAU describes on another page. It usually presents itself as an acute abdominal colic suggesting intestinal obstruction; the patient vomits repeatedly and is constipated till the attack is over, when he may pass fæces in small hard fragments accompanied by blood-stained mucus. The abdomen may or may not become distended, and there is often a little fever. It is not surprising that this picture often leads to laparotomy; no organic lesion is found, but constrictions and anæmic areas in the upper jejunum, with dilatation above and contraction of the gut below, have been described and have suggested local vascular spasm as the mechanism. In this, as in its other features, the attack closely resembles lead colic, but its hall-mark is the appearance of a red or brown colour in the urine due to porphyrin (often accompanied by another red pigment, as yet unidentified). The symptoms may continue for days or even weeks, but they more often subside in a shorter time. Attacks recur at long or short intervals, sometimes in women in association with menstruation. A wide variety of neurological symptoms, some suggesting encephalitis and others peripheral neuritis, have been described as occurring with the attacks of colic, but the basis and pattern of these are as yet ill-defined. The porphyrin excreted is of the series III, and could therefore be derived from hæmoglobin, but evidence of hæmolysis is lacking and there is no record of methæmoglobinæmia; so it presumably results from a more intimate disturbance of pigment metabolism. There is little to suggest that the porphyrin itself is responsible for the symptoms; its excretion seems merely to accompany them. The third clinical variety of porphyrinuria is almost entirely different from the first two. It was studied in this country by Sir ARCHIBALD GARROD, who called it congenital hæmatoporphyrinuria. It is an "inborn error of metabolism," inherited as a Mendelian recessive. Those who suffer from it excrete considerable amounts of a series I porphyrin from infancy onwards. Their skins become acutely sensitive to light and unless protected show recurrent hydroa æstivale. Their teeth and bones are stained red. The condition is also seen in cattle.

The study of these rare conditions may lead the biochemist to an understanding of the metabolism of hæmoglobin and the respiratory pigments of the cell. The clinician's chief concern is with the recognition of acute porphyrinuria, idiopathic or due to drugs; if he makes the diagnosis he can save his patient from an unnecessary operation, though unfortunately he can offer no effective treatment, and he must expect a mortality of about 50%. Simple tests which he may perform upon the urine are described by CHANDLER, HARRISON and RIMINGTON,[7] who recorded a fatal case of acute idiopathic porphyrinuria last year and gave a summary of the chemistry of the porphyrins. They chose the term "clinical porphyrinuria" to cover the three clinical groups. This does no more than label the disease by one of its signs, but it is more explicit than the non-committal term "porphyry," a name already borne by a mineral beloved of the poets and by a third-century philosopher.

5. Brownlee, G. *Proc. R. Soc. Med.* 1939, **32**, 1276.
6. Waldenström, J. *Acta med. scand.* 1937, Suppl. 82, p. 1.

BURNS OF THE HANDS AND FACE

LAST week we reported a meeting of the Royal Society of Medicine at which all speakers agreed that tannic acid should no longer be used as an application for burns of the face, hands or feet. The tanning of the tissues, desirable in the treatment of burns of other parts, causes dangerous compression of the blood-vessels to the fingers and toes, and by stiffening the eyelids may lead to exposure of the cornea. We have received anxious inquiries from A.R.P. workers as to what should be applied to burns on the hands and face. It is understood that the Navy and R.A.F. propose to issue for the purpose collapsible tubes of a jelly containing 1% of gentian violet and 0·02% of Merthiolate. There are, however, objections to gentian violet for general use. It is not easily obtainable and it does form a coagulum, though a softer one than tannic acid. In E.M.S. hospitals the application recommended is tulle gras; this consists of curtain net with a 2 mm. mesh soaked in soft paraffin 98 parts, halibut oil 1 part and balsam of Peru 1 part[8]; it can be kept in tin boxes and applied directly to the burn. Saline packs can be applied outside it and the saline will penetrate the mesh. For first-aid antiseptics should be avoided, and certainly no antiseptic should be used near the eyes. First-aid parties dealing with a burn of the face, hands or feet will be best advised to apply either tulle gras or plain sterile dressings, so that the hospital surgeon will be able to make an unhampered diagnosis when he sees the case for the first time. There is no objection to the use of tannic acid elsewhere on the body. A committee is now considering the first-aid treatment of burns, and is to announce its proposals shortly.

Dr. LETITIA FAIRFIELD has been appointed to the Royal Army Medical Corps with the relative rank of lieutenant-colonel as woman medical adviser to the War Office and member of the Auxiliary Territorial Service Council. In the last war Dr. Fairfield was woman medical director of the R.A.F. medical service.

The fifth list of subscriptions to the Medical War Relief Fund brings the total amount contributed to over £9800.

7. Chandler, F. G., Harrison, G. A. and Rimington, C. *Brit. med. J.* 1939, **2**, 1173.
8. Tulle Gras (Lumière), Anglo French Drug Co.; Nonad Tulle, Allen and Hanburys.

Annotations

DELAYED PRIMARY SUTURE

THE ideal treatment of a war-wound is immediate excision and suture, but this may be dangerous if applied to badly contaminated wounds with much laceration and crushing of the tissues, especially if there has been delay in starting treatment. In many cases it is necessary to leave the wound unsutured, and this is an essential part of the closed plaster technique. The advantages of this method are undoubtedly great—the free drainage is an important safety factor; the close-fitting plaster promotes the healing of all tissues by immobilising and supporting them and prevents subsequent reinfection of the wound from without, which may be more serious than contamination at the time of infliction; patients are spared the pain and nurses the labour of frequent dressings; and transport is greatly facilitated. On the other hand, an open wound may take weeks and even months to heal by granulation and the long immobilisation will certainly lead to considerable stiffness; the diagnosis of complications in a covered wound is difficult; the application of the plasters is time-consuming even when done by experts; and no effective remedy has yet been devised for the noisome stench.

If immediate primary suture is ideal but dangerous, healing by granulation even under a plaster is a poor second best. Is there no compromise? An answer may be found in delayed primary suture, which has many of the advantages of immediate suture without its danger, and which avoids the snags of Trueta's method. Delayed primary suture is not new—it became popular at the end of the last war. Fraser and others[1] found that 60·8% of wounds of the limbs admitted to a C.C.S. were suitable for closure and of these approximately half were treated by delayed primary suture. After a culture had been taken the wound was carefully excised, treated with an antiseptic such as flavine, and lightly packed with gauze. Sometimes the sutures were placed at this operation. Two to four days later the wound was closed, provided that it appeared clean and healthy, that the patient's general condition was satisfactory and that hæmolytic streptococci had not been found in the culture taken from the wound at the first operation. In certain cases (for instance in streptococcal infection) suture had to be delayed as long as fourteen days. Fraser and his colleagues considered that the healing of wounds closed a few days after the primary operation was nearly as good as that obtained by immediate suture. Delayed suture was certainly the surer method, for there were only 4% of failures compared with 20% after immediate closure. Equally satisfactory results were recorded by Girling Ball[2] and Hepburn.[3] Quite recently Coller and Valk[4] have written on the method as applied to abdominal operations in which the wound is contaminated from the bowel. In such cases their custom is to suture the peritoneum and deeper layers of the abdominal wall in the usual way but to pack the superficial layer with flavine gauze after placing, but not tying, the sutures. In twenty-four or forty-eight hours the gauze is removed and the superficial suture tied. In 21 cases they had only a single instance of infection and that was only slight. It may be that the local application of sulphanilamide will make delayed primary suture safer, and even without this modern refinement a method which has such obvious advantages and was evolved after four years of intensive experiment deserves a place in the treatment of war-wounds to-day.

1. Fraser, F. *Brit. J. Surg.* July, 1918, p. 92.
2. Ball, W. G. *Brit. med. J.* 1918, **1**, 898.
3. Hepburn, H. H. *Ibid*, 1919, **1**, 181.
4. Coller, F. A. and Valk, W. L. *Ann. Surg.* August 1940, p. 256.

CATCHING PNEUMONIA IN THE HOME CIRCLE

ALTHOUGH secondary attack-rates for pneumonia have been calculated for an epidemic area[1] no attempt has hitherto been made to determine the rate of attack in family aggregations. At the Detroit convention of the American Public Health Association last month E. S. Rogers, M. Robins and M. G. Arnstein reported on 13,500 household contacts in a sample population of New York State. For pneumonia their figures show a remarkable preponderance of secondary attacks at the extremes of age.

Age of contact	Clinical type	No. of contacts	Secondary cases	Secondary attack-rate per 1000 contacts
Under 5	Broncho	625	24	38·4
	Lobar	740	13	17·6
5–14	Broncho	1480	11	7·4
	Lobar	1873	8	4·3
15–24	Broncho	853	3	3·5
	Lobar	1186	2	1·7
25–44	Broncho	1655	9	5·4
	Lobar	2073	11	5·3
45–64	Broncho	723	5	6·9
	Lobar	1091	11	10·1
65 and over	Broncho	232	2	8·6
	Lobar	302	6	19·9
All ages	Broncho	5662	54	9·5
	Lobar	7368	52	7·1
	All forms*	13,490	111	8·2

* "All forms" includes 460 contacts and 5 secondary cases among household contacts of index cases of unspecified pneumonia.

The authors point out that the high rate found among contacts under 10 years of age is not due to the concomitant household occurrence of measles or whooping-cough, since only 3 cases of measles and no whooping-cough were encountered in the 54 secondary cases in this age-group. The crude secondary attack-rate of 8·2 per 1000 household contacts may be compared with the rate for tuberculosis household contacts in two areas of the same state as reported by G. H. Ramsey, M. T. Bellows and H. F. Silverman at another session of the convention. The attack-rate from tuberculosis was 16·8 per 1000 household contacts, which is ten times the incidence for the total population of upstate New York. When adjusted for seasonal variation the pneumonia attack-rate is reduced from 8 to 6 per 1000, but even then it is 28 times the risk experienced by the population at large.

RECTAL SULPHANILAMIDE

PERSISTENT vomiting is a complication of the treatment of infections by sulphanilamide and may interfere with accurate dosage. Hence the possibility of using other routes of administration has been, and is being, studied. Intravenous medication, whilst often simplest, demands asepsis, a product which can be injected intravenously and a vein into which it can be injected. Furthermore four-hourly intravenous therapy becomes tedious. Rectal administration, however, can be carried out by any trained nurse. Turell, Marino and Nerb[2] have compared the absorption of sulphanilamide by the colon and rectum from a solution of the drug and from suppositories containing sulphanilamide. The concentration of sulphanilamide in the blood after the suppositories was inadequate, but the solution gave a concentration comparable with that resulting from administration by mouth. For instance, after giving 12 g. of sulphanilamide in the course of 48 hours they found the total concentration in the blood to be 10 mg.

1. Gilman, B. B. and Anderson, G. W. *Amer. J. Hyg.* 1938, **28**, 345.
2. Turell, R., Marino, A. W. M. and Nerb, L. *Ann. Surg.* September, 1940, p. 417.

of free and conjugated sulphanilamide. They suggest that the total dosage should be the same as that given by mouth and this is supported by their figures. One case they describe suffered from nausea, and this is a reminder that the vomiting of sulphanilamide is, in part at least, of central origin. It is unfortunate that the poor solubility of sulphapyridine in water precludes the rectal use of an aqueous solution but the difficulty will perhaps be overcome in other ways.

REFINED ANTITOXIN

REFINED antitoxin resulting from the peptic digestion of the crude product was introduced to this country by Pope[1] in 1938, after its discovery in America. The digestion process is applicable to antitoxic but not to antibacterial sera, and seems to give better yields with some antitoxins than with others. Its use clinically enables large doses to be given in very small volume and with only a low incidence of serum reactions. Yet some workers have been wondering if these refinements in antisera are being obtained at the expense of clinical effectiveness, and they point to the persistent fatality-rate in diphtheria. The experimental evidence is reassuring, for Glenny and Llewellyn-Jones[2] have shown that refined diphtheria antitoxin injected subcutaneously into guineapigs is absorbed more quickly, and, surprisingly, is retained longer in the tissues than the chemically concentrated antitoxin. Corroborative clinical studies are needed—for example, it would be a useful practical point to find out if refined tetanus antitoxin given prophylactically protects the individual for as long as an equivalent dose of unconcentrated antitoxin. And again, it would be important to know if refined antitoxin has a greater facility than its crude counterpart for combining with toxins already in the tissues. In this connexion the (unpublished) observations of Hartley are apposite. He showed that guineapigs—or guineapig uterus—could be passively sensitised to diphtheria antitoxin if the antitoxin was derived from guineapig, rabbit or man, whereas antisera from horse, ox, goat, sheep and pig were ineffective. Refined horse antitoxin was no more acceptable to the guineapig tissues than the crude product. His findings suggested some chemical or biological affinity among the antitoxic globulins of man, rabbit and guineapig, and there seemed some support for this view in the differences established by Goodner and Horsfall[3] between horse and rabbit antipneumococcus sera. It will be remembered that these workers showed the rabbit antibody molecule to be only about a third of the size of the corresponding horse molecule, which, they suggested, made the rabbit serum more diffusible in the tissues.

The aim of serum-therapy must be to supply a substance which, besides a high content of antibody, should have an avidity for the homologous toxin and should be as little foreign to the human body as possible, so that by being adsorbed and retained by the poisoned tissues it may effect the maximum neutralisation of toxin. The preventive and curative use of serum from cases of convalescent measles, and in America scarlet fever, are examples to be emulated. If this could be done the other drawback, namely, the risk of anaphylactoid reaction when a second dose of serum has to be given a few weeks after the first—and with air-raid casualties this is a real risk—might also be lessened. To overcome this danger Coghill and his co-workers[4] have prepared a refined antitoxin by digestion of the crude serum with Taka-diastase, a complex enzyme with proteolytic, lipolytic and carbohydrate-splitting properties. This product caused only mild anaphylactic symptoms in guineapigs sensitised to normal horse-serum. The altered specificity, or "despeciation" as the authors call it, is attributed by them partly to purification and partly to some chemical alteration in the antibody-molecule, possibly in the carbohydrate portion of the globulin Although a peptic digestion did not give the "despe. ting" effect there may in fact be some immunological d.: erence between the biologically (peptic) and chemically purified antitoxins.[2]

1. Pope, C. G. *Brit. J. exp. Path.* 1938, **19**, 245.
2. Glenny, A. T. and Llewellyn-Jones, M. *J. Path. Bact.* 1938, **47**, 405.
3. Goodner, K. and Horsfall, F. L. *J. exp. Med.* 1937, **66**, 413, 425, 437.
4. Coghill, R. D., Fell, N., Creighton, M. and Brown, G. *J. Immunol.* September, 1940, p. 207.

OXYGEN FOR MIGRAINE

Alvarez and Mason[1] have reported the effect of administering pure oxygen through a B.L.B. mask to patients with severe headache. The treatment is purely empirical, and has no physiological support at all, but the authors are impressed by the improvement that they obtained when the headache was migrainous in type. Altogether 97 cases were treated, the oxygen being administered during the period of headache. Most patients were only treated once, but some had as many as ten periods of inhalation. On clinical grounds the headaches were divided into those of typical and atypical migraine, and those which had no relationship to migraine; 42% of subjects with migraine were relieved completely during the attack and 36% were much improved; by contrast only 12% of those with non-migrainous attacks were much improved while none was completely relieved. Even in the migrainous patients the results were as variable as those experienced with ergotamine tartrate, but the disparity between the response obtained in migrainous and other forms of headache suggests a specific action of oxygen. Viewed conservatively, however, the results are not so encouraging as would appear from the figures quoted, for the authors say that some headaches were relieved within 15 min. of beginning to breathe oxygen, while inhalation for 2 hours was needed in other patients. In other cases, again, the headache returned an hour after inhalation had ceased and it did not subside until the end of a further hour's administration. When the variable nature of the migrainous attack is considered, such results cannot be attributed to the therapeutic procedure in some of the cases, and many neurologists have already discarded the administration of oxygen in migraine in favour of ergotamine tartrate or even phenobarbital. Unfortunately, the exact changes in the intracranial vessels which appear to be responsible for migraine are not yet fully understood, although within the last few years enormous advances have been made in our knowledge of the functional activity of the cerebral vascular network. It is probable that a rational and truly effective form of therapy will not become available until the intracranial vasomotor changes are fully appreciated and methods to counter these changes are made available.

TWO NEW VIRUS DISEASES OF MAN

THE last twenty years of the nineteenth century will be remembered as the golden age of bacteriological discovery; the period between the two world wars deserves equal credit in regard to virus research. Not only many long-known diseases but also many new ones have been traced to virus infection. To the long list of viruses capable of attacking the nervous system must now be added two new-comers, one from Soviet Russia and the other from Uganda. In 1937 cases of human encephalitis were described in the Soviet far east by Chumakov and Gladkikh.[2] The disease, known as Taiga or spring-summer encephalitis, is endemic in various well-wooded localities and makes its appearance about the end of May or the beginning of June—a period

1. Alvarez, W. C. and Mason, A. Y. *Proc. Mayo Clin.* Sept. 25, 1940, p. 616.
2. Chumakov, M. P. and Gladkikh, S. G. *Bull. Biol. med. exp. U.S.S.R.*, 1940, **7**, 2.

before the appearance of the mosquito plague—but cases continue till September. The people affected are wood-cutters, hunters and others whose occupations take them into the forests. The onset is sudden with fever, vomiting, meningismus, loss of consciousness and often flaccid paresis, paralysis and atrophy affecting especially the muscles of the upper limbs and neck. From the brains of three people who died of the disease, and from the blood of one patient, strains of a virus pathogenic to mice have been isolated. In many ways the new virus resembles those of St. Louis and the Japanese B encephalitis, although it appears to differ in antigenic structure. It is transmitted by the bite of the tick *Ixodes persulcatus* Schulz 1930, thus resembling the virus of louping ill which is carried by *I. ricinus*. Unlike louping ill, however, the Soviet virus is said to be hereditarily transmitted by the tick, which suffers no ill effects. Pavlovski[3] incriminates two other ticks as vectors, *Dermacentor silvarum* Olen. and *Hæmaphysalis concinna* Koch, in both of which hereditary transmission occurs. The same virus has also been isolated from the brains of wild rodents such as squirrels and hares living in endemic areas. Chumakov and Seitlenok[4] consider that the disease is not confined to the far east of Siberia because the sera of persons from western Siberia and from places in European Russia, Belarussia, Perm and Kirov contain antibodies to the virus. Belarussia is a western district adjoining the Polish frontier. This tick-transmitted encephalitis is apparently quite distinct from the Russian form of equine encephalomyelitis, though whether the Russian, like the American, equine encephalomyelitis virus is pathogenic for man is still unknown.

Another neurotropic virus has recently been found in Uganda by Smithburn and his colleagues[5] of the Rockefeller International Foundation. The virus was originally isolated from the blood of a woman who showed no symptoms except slight fever. When the virus was inoculated into the brains of mice they developed nervous symptoms and died, as did rhesus monkeys inoculated intracerebrally. The degenerative changes present in the Purkinje cells of the cerebellum recall those produced by the louping-ill virus, but there is no cross immunity either with this virus or with those of Japanese B or St. Louis encephalitis. Sera from natives of the West Nile district of the Northern Province of Uganda contain immune bodies against the new virus. Further observations are required to determine its distribution in Africa and elsewhere.

MODERN TREATMENT OF EPILEPSY

FOR the last hundred years people have been curious about the nature of epileptic phenomena, but only in the last ten, thanks to the electro-encephalogram, have we gained any real insight into it. Epilepsy, writes Lennox,[6] is a symptom of a disturbance in the electrochemical activity of the discharging cells of the brain; it is a paroxysmal cerebral dysrhythmia. Such dysrhythmia does not always produce fits, but it certainly predisposes to them, and it is found not infrequently in the parents of epileptics.[7 8] Its discovery and treatment opens up a new vista of therapy. Cellular physiology plays an important rôle in epilepsy: for instance, alkalosis and œdema of the brain enhance the frequency of fits, acidosis and dehydration diminish them.[9] This led clinicians to try giving a ketogenic diet and restricting fluids, but in neither case was the success commensurate with the discomfort. Moreover it was soon realised that measures like these did not strike at the root of the trouble. Therapeutic asceticism has given place to a diligent trial of anticonvulsants.

Some difference of opinion has arisen as to how far Luminal can be pushed. In America it has been suggested that each patient has his optimum dose, and there is no need to be afraid of giving gr. 9 a day or even more if necessary. To obviate the drowsiness, or possibly ataxia, which these large doses may cause, Cohen and Myerson[10] give benzedrine sulphate in doses up to 20 mg. a day, and this drug may possibly reinforce the action of luminal in controlling seizures. Lundin, epitomising Scandinavian experience, finds[11] this combination can be given for long periods, with benefit to mental outlook and stability. In a few instances attacks of petit mal were controlled better with the two drugs in combination than with luminal alone. On the other hand, Stone, Finkelman and Arieff found[12] the addition of benzedrine to luminal in nine cases failed to combat drowsiness, although it was apt to prevent sleep at night and in two patients gave rise to tremor and apprehension: Evidence of the value of Epanutin (Dilantin, sodium diphenylhydantoinate) is accumulating. Lundin's results accord well with those of others, although he provides yet another name (Epifenyl) for this unfortunate drug. There is, however, little if any margin between therapeutic and toxic doses; the commonest drawbacks are nausea, nystagmus, tremors and paræsthesiæ which occur early; less common are rashes with pyrexia later on. Lundin saw one case of hyperplasia of the gums and three of mental derangement, one at least clearly attributable to the drug; and Williamson has just reported[13] four deaths during epanutin treatment of twenty mentally defective epileptics. Toxic symptoms came on after the drug had been taken for six weeks or more, although the dosage was not unduly high; low-grade subjects were more intolerant of the drug than the higher grade, the cause of death being status epilepticus in three cases and bronchopneumonia in one. In so uncertain a disease as epilepsy there is special need for care in tracing cause and effect, but every case of "intercurrent" death during epanutin treatment should be considered in the light of his findings.

Blair has made[14] a critical survey at Cane Hill of the merits of all the anticonvulsant drugs now in general use, discussing their pharmacological action and therapeutic use. He joins Lennox in condemnation of a defeatist attitude, having satisfied himself that with patient and efficient trial of available remedies there are few epileptics who cannot expect reasonable control of their fits. He has a good hope that relief may be found for the victims of traumatic epilepsy.

Mr. Eric Gill, who died on Nov. 16 at the age of 58, will be regretted not only by those who appreciate his work as a sculptor and engraver but by anyone who enjoys reading a page of good type. His contribution to the printer's word is exemplified in the beautiful sans type which bears his name.

3. Pavlovski, E. N. Summaries of Reports of the All-Union Conference of Workers in Microbiology, Epidemiology and Infectious Diseases, Moscow. Jan. 25–31, 1939 [in Russian]. Chumakov and Seitlenok, N. A. *Science*, Sept. 20, 1940, 264.
4. Smithburn, K. C., Hughes, T. P., Burke, A. W. and Paul, J. H. *Amer. J. trop. med.* 1940, **20**, 471.
5. Lennox, W. G. *J. Amer. med. Ass.* 1940, **114**, 1347.
6. Lowenbäck, *Bull. Johns Hopk. Hosp.* 1938, **65**, 125.
7. Lennox, W. G., Gibbs, E. L. and Gibbs, F. R. *J. Amer. med. Ass.* 1939, **113**, 1002.
8. Lennox and Cobb, *Medicine*, 1928, **7**, 105.
9. Lennox and Cobb, *Medicine*, 1928, **7**, 105.
10. Cohen, B. and Myerson, A., *Amer. J. Psychiat*, 1938, **95**, 371.
11. Lundin, G. *Nord. Med.* 1940, **7**, 1635.
12. Stone, T. T. et al. *Amer. J. Psychiat.* 1940, **96**, 1377.
13. Williamson, B. A. M. *J. ment. Sci.* 1940, **86**, 981.
14. Blair, D. *Ibid*, p. 888.

On Sunday, Nov. 24, at 3 P.M., Dr. Henry Wilson and Dr. H. V. Dicks will open a discussion on the manifestations and treatment of war strain. Colonel J. R. Rees will be in the chair and the meeting will be held at the Tavistock Clinic, Westfield College, Kidderpore Avenue, Hampstead, N.W.3.

On Tuesday, Dec. 3, at 2.30 P.M., Prof. J. D. Bernal, F.R.S., will address the Royal Institution on the physics of air-raids. The meeting will be held at 21, Albemarle Street, London, W.1.

Special Articles

OCCUPATION THERAPY FOR WAR NEUROSES

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(From an E.M.S. Neurological Unit)

SINCE the first occupational-therapy department was opened in Glasgow Royal Mental Hospital, as described by Henderson,[1] much has been written on the advantages to the nervous or mental patient of occupation calculated to develop new interests, utilise latent capacities, and bring him back to a successful relationship with society; experience has shown that the nursing of these patients has been made easier, and the wards happier and more contented. In recent years, however, trends in occupation therapy have threatened to diminish its value by over-emphasising some features to the neglect of the total possibilities. The therapist, still an innovation in the less up-to-date hospital, has had to withstand a certain critical conservatism on the part of the nursing and administrative hierarchies. Becoming unduly self-conscious of his significance and devising new techniques, he has ignored the other functions of the hospital and grown increasingly isolated. This divorce has too often produced the anomalous position of one group of patients "helping in the hospital" and another "having occupation therapy."

On the outbreak of war I was given the task of organising occupation therapy for a neuro-psychiatric unit of 200 beds in an E.M.S. hospital of 800 beds, and received continued assistance and encouragement from the medical superintendent and the senior clinical staff in building up a coördinated scheme. By the beginning of 1940 the unit was being used for cases of war neurosis and in time civilian cases were entirely replaced by service patients. The cases included ordinary neuroses in which army service was but an incident, anxiety depressions precipitated by war service, hysterical cases, recent and late post-traumatic syndromes and, since May, the acute neuroses produced by intensive bombardment in Flanders.

The hospital had been selected for the E.M.S. because it had previously been a training centre for unemployed and had advantages for occupational training. It stands in a farm of some 25 acres with poultry yard, piggeries, vegetable gardens and greenhouses. The instructor in sign-writing had been retained, and had a shop capable of holding some 30 patients who could be instructed in ticket-writing, mechanical drawing, model-making, and woodwork. Some months later a woman occupation therapist was appointed and a pleasant room in the hospital provided for her, with material for rug-making, weaving, knitting, and other handicrafts. In addition, the maintenance departments of the hospital included carpenter's, tailor's, and upholsterer's shops, with trained workers in charge; a well-appointed gymnasium and an instructor were also available.

AN ORDERED ROUTINE

In formulating the programme I took account of the time during which the patients were to be occupied, the aim being to let occupation fill a portion of the day comparable rather with the healthy man's hours of work than with the invalid's period of treatment or recreation. This avoided "hospitalisation"—that insidious adaptation of the individual to an idle and abnormal existence at the very time when he is undergoing treatment for a failure to adapt to greater demands. The hours finally arranged were 9.30 A.M. to 12 noon and 2 P.M. to 4 P.M.; on Wednesday and Saturday active treatment ended at noon and on Sunday no occupation was given. Passes from the hospital—given freely to suitable patients—were granted from 4.30 to 8 P.M. on full days and from 1 P.M. on Wednesday, Saturday, and Sunday. This was adhered to except in special cases, and later it was found desirable to limit to these free periods the many entertainments and outings offered locally to service patients.

In order to promote a feeling that occupation was the normal routine a patient was introduced to it as soon as possible. It has been found practicable to have about 75% of the patients in the ward in active occupation; the remaining 25% were new admissions still undergoing examination, patients having other treatment and those considered unsuitable by their physician. Every hospital activity was utilised as far as possible to provide satisfying employment, leaving plenty of scope for ingenuity and resource in meeting individual needs. This wider programme has prevented the illogical separation of work and occupation therapy, but watchfulness has been necessary to prevent the staff from gradually exploiting patients in the running of the hospital instead of bearing in mind that the well-being of the patients is the only justification for the hospital's existence. By keeping every form of work, including the ordinary ward cleaning, under the supervision of the occupation department, and by having each patient's work prescribed by his physician, it has been possible to make every patient realise that occupation is part of his treatment.

VARIETIES OF OCCUPATION

In the occupation room the woman therapist has charge of the more orthodox activities, and assisted by nurses in the wards, she is also responsible for the occupation of bed patients. Relatively few patients elected to do crafts here, and attention could be given to those requiring an individual approach. A number of depressive and post-traumatic patients have found the quiet of this section beneficial, and its importance as a transition stage in the treatment of the acutely disturbed war neurotics has been increasingly recognised. Heavier handiwork is done in the sign-writer's shop, where patients learn lettering and sign-painting and where individual tastes in painting, drawing and model-making can be gratified. By arrangement with the steward and matron, waste-paper baskets, knife-boxes and signboards have been supplied to the hospital from these sections, thus diminishing expenses for material; and the patients have been asked to pay for the materials of articles they make for themselves. The carpenter's shop has proved popular, and the speed with which untrained men have developed facility in the use of tools is striking. Under the control of one instructor, up to 20 or 30 patients can be employed in furniture-repairing or in making articles for themselves. In the upholsterer's shop the work is mainly the carding and teasing of wool and the stitching and packing of mattresses; the quietness and relative monotony have appealed to some anxious patients; but patients of lower intelligence who were originally thought suitable for it were later found to require more change and variety. Some men have found satisfying employment in the tailor's shop, making and repairing hospital bedlinen and uniforms, but others thought the work beneath their dignity; valeting or repairing their own or their comrades' clothes has been more popular. Gardening, like the handling of tools, appears to satisfy one of the essential needs of the average man; the farm and garden have provided work in the open air, ranging from light tasks like the thinning and weeding of seedlings to the heaviest manual labour. Heavy labour has been of great benefit to some; the average working-man may find work requiring concentration on detail a weariness and oppression. For the agricultural workers who have broken down through failure to adapt to army life farm work has proved almost a specific and has allowed of a speedy return to their proper field.

Physical training has also been included in the sphere of the occupational department. A class of graduated physical exercise has replaced occupation from 2 to 3 P.M. for those patients doing sedentary work. Special classes in remedial exercises have been arranged for individual patients at other hours. Recently a proposal has come from the surgical side of the hospital that selected occupations should be used to provide remedial movements for patients disabled as a result of injury.

1. Henderson, D. K. and Gillespie, R. D. Textbook of Psychiatry, London, 1933.

This will involve a liaison with the massage department. The possibility has been kept in view of giving vocational training to cases so much disabled that they can no longer follow their old civilian occupation.

A medical officer was put in charge of the occupational department which has thus been given its proper significance. Where so many sections of the hospital's life are invaded only a doctor possesses sufficient prestige to introduce new ideas and to adapt and give way without losing his footing. A member of the male nursing staff, later known as the occupational attendant, who had some occupational experience and a technical artisan training and who in addition was intelligent, resourceful and tactful, supervises the coming and going of patients. In practice it has been found possible to depute to him much of the day-to-day adjustment of work. From the beginning, however, both the medical officer responsible for occupation and the occupational attendant have taken it as an axiom that their responsibility is derived from the patient's own doctor and ward-sister. While a certain independence is essential to coördinate and unify, care is taken not to arouse antagonism nor to claim independent authority. In the separate sections the therapist, instructor, or worker is never dislodged from his position in charge. Great importance has been attached to the consistent maintenance of these fundamental attitudes, and the relatively smooth working of the scheme must be attributed to adherence to them.

OCCUPATION CARDS

Work is prescribed as follows: a card with suitable headings is placed in each case-record on admission; in this the doctor fills in the patient's name, age, and civilian occupation, with a brief note on his condition and a recommendation or suggestion for suitable occupation; these cards are left with the sister of the ward and collected each morning by the occupational attendant, who allocates the patients. It has been found necessary for him to keep a list of the allocations in each ward. At 9.30 A.M. and at 2 P.M. he collects the patients and takes them to their appropriate sections, where the therapist or worker in charge keeps a list of his patients. If necessary, a nurse is placed with a patient, since the worker cannot be responsible for a patient requiring special observation or care. A week before a patient's discharge or on the request of his physician, a report is submitted on the man's performance and behaviour in occupation. This is often unexpectedly revealing, sometimes giving an entirely different impression from what might have been expected on the evidence of ward behaviour or of interviews with the doctor. It is also of value in making recommendations for the patient's future when the question of invaliding or discharge to duty arises.

While the average patient is glad to have occupation, none is immune from human weakness, and classes are not infrequently missed. One of the healthy features of work is its recurring inevitability and accordingly attendance at occupation is given the force of a medical order. The formula that patients not feeling well enough to attend occupation are not fit to have outside passes usually proves effective, but patients who refuse to attend occupation or consistently make difficulties are referred to their own doctor, and some have had to be sent by him for military disciplinary action. Although these cases are rare, appeal to the military authorities had sometimes to be made to prevent lethargy and disaffection; for it was early discovered that the average soldier, accustomed to extracting the amenities of existence from a life hedged in with restrictions, considers it a point of honour to ignore regulations.

SUMMARY

A short account is given of the organisation of occupational therapy in a hospital for neurotic casualties. The factors determining success have been found to be as follows:—

The work done, as far as possible, should be useful.

The occupational-therapy department should not be an isolated unit, but an integral part of the whole hospital routine.

In order that this may be attained and maintained without friction the department should be under the direct and single control of a medical officer, who provides prestige, authority, and adaptability to new circumstances.

The work should be as varied as possible, and should resemble, in quality, quantity and actual heaviness of labour, that usually performed by the patient in ordinary life.

The patient's own physician should prescribe the type of work he is to undertake.

Occupational therapy should be regarded as an individual therapy as much as psychotherapy, chemotherapy, or any other form of treatment.

CEREBROSPINAL FEVER IN GERMANY

Two recent articles in the German medical press appear to give some clue to the incidence of meningococcal disease in Germany since war began; they also reveal, so far as this disease is concerned, the present state of chemotherapy in that country. Both the series of cases described are small and sporadic in incidence. Neither from these cases in Remscheid and Hamburg, nor from the quoted German literature, can we gather any evidence of an epidemic prevalence of the disease comparable with that which has prevailed in this country during 1940.

Horst and Paul[1] having treated 16 cases with combined uleron and serum, seem quite satisfied with a case-fatality rate of 18·7 per cent. Four of the cases were infants, eight were young children and the remainder adults. Of these, two infants and one woman aged 54 died. This result is compared with 20 deaths in a series of 30 serum-treated cases during the years 1930–38, a mortality of 66·6 per cent. Emphasis is laid on the mode of administration of uleron. The authors are impressed with the near relationship of the gonococcus and the meningococcus, and have applied to the treatment of meningitis methods similar to those employed in the treatment of gonorrhœa with uleron in Germany. The tablets were given by mouth in three courses each of three days' duration, each course being separated by an interval of five days. The treatment of each case thus extended over a period of nineteen days. The daily dose for infants was 2 g., for children 4·5–6 g. according to age, and for adults 7·5 g. The drug was administered three times daily. The authors consider that this method of high dosage in short courses gives better results than a protracted continuous course of small doses which, they say, tends to uleron-fastness. The combination of the drug with serum, as being theoretically sound, is also favoured. The average duration of hospital treatment in the uleron series was 31·8 days, and in the earlier serum-treated series was 44·4 days. It is difficult to avoid the impression that in the chemotherapy of meningitis the authors have hardly progressed beyond the stage that was reached in this country in 1937 or 1938.

Somewhat more advanced ideas are expressed by Säker[2] of Hamburg, who has treated 43 sporadic cases from the beginning of 1939 to date. The drug used was sulphapyridine, under the proprietary name Eubasinum. Daily lumbar puncture was also employed but no serum. In this series there were three deaths, but the author suggests the exclusion of an infant admitted moribund and a woman of 67 with intercurrent disease, thus leaving one genuine failure to 40 successes. Eight of the cases were under one year of age, and in this group was the one admitted failure. The average duration of the illness was five days. The author emphasises that these favourable results were obtained in *sporadic* cases. He would expect a higher percentage of failures in an epidemic, with its larger proportion of very acute cases, especially in infants. The action of the drug, he states, is limited by the latent period (about 6 hours) that elapses before bacteriostasis begins; this is the vital factor in the hyperacute cases. He found that on the second day of treatment the culture would usually not grow, and only on the 3rd and 4th days was there full destruction of the meningococci. The latter time corresponded with the decline of meningeal inflammation, which ended after a further three days. An additional

1. Horst, H. and Paul, R. *Dtsch. med. Wschr.* Sept. 27, 1940, p. 1081.
2. Säker, G. *Ibid*, Sept. 20, 1940, p. 1039.

measure considered to be of importance was daily removal of cerebrospinal fluid, but not serum treatment. Meningococci were seen in all the cases but were cultured in only half. No typing of the organisms was done. The total amount of sulphapyridine given varied between 12 g. and 30 g., according to severity, and averaged 20 g. The drug treatment was continued until the fluid became clear. It was administered by mouth except in the stuporose, when it was given at first by rectum. The daily dose for adults was 3–4 g. for the first few days, and this was reduced by 1–2 g. daily for some further days. In infants and children great care was taken with the initial dosage, which was higher proportionately than in adults, and was generally about half the adult dose.

Fifteen German publications are quoted all dealing with small numbers of cases, mostly 6 to 20. The largest of these series is that of Hoppe in which 39 cases were treated with sulphanilamide with 8 deaths. In this literature four series were treated with sulphapyridine and serum, four with sulphanilamide and lumbar puncture, and three with Albucid and lumbar puncture. On this basis the author gives his impressions of the relative value of the various sulphonamides. Sulphapyridine is placed first, then sulphanilamide, and third, albucid. Uleron and Prontosil Rubrum he considers to have too slight an action against meningococci.

Certain differences between current German and British practice revealed in these articles may possibly be due to lack of experience in Germany of chemotherapy in severe epidemics. Säker's 43 cases appear to be the largest chemotherapeutic series yet published in Germany, and he claims that his results are better than most. His gross mortality of 7 per cent. in 43 cases is about the same as a corresponding British series of sporadic cases published [3] a year earlier, namely 6·6 per cent. in 76 cases, and the complication rates, both of which included two cases of complete bilateral deafness, are not dissimilar. Säker's dosage of sulphapyridine is, however, distinctly smaller than that which we employ. Whether this low dosage would be sufficient for severe epidemic cases is doubtful. There is a curious absence of any reference to difficulties caused by drug intolerance, especially nausea and vomiting. Nor is there any mention of intramuscular or intravenous injection, nor of any soluble preparation suitable for this purpose. The insistence on daily spinal drainage until the fluid is clear appears old-fashioned, since it has been the experience of many in this country, e.g. Williams and Brinton,[4] that the majority of cases need no more than a single diagnostic lumbar puncture. On the other hand, this German writer at least definitely considers serum to be unnecessary as additional treatment. Although difference of opinion on this point evidently exists in Germany as in Britain, the tendency to rely upon chemotherapy alone is undoubtedly increasing in this country and has at last received official sanction in the recent memorandum issued to the Army Medical Service.[5]

EXTRA-MURAL WELFARE

WITH the great expansion of industry the army of workers has been reinforced by many fresh recruits. They have poured into industrial towns which were already overcrowded and into country places where large factories have been built. They need to be housed and fed, transported to and from their work and provided with facilities for recreation in their leisure hours, but they have often been left to shift for themselves and bivouac where they can. The problem is fourfold, because the needs and interests of grown men and women and young boys and girls are all different; and the provision made for them must depend upon whether they are living in towns or country districts. When the factory department of the Home Office was transferred to the Ministry of Labour, additional welfare officers were appointed to deal with what might be called extra-mural welfare. Vernon has pointed out [6] that apart from the risks of his occupation the worker's bodily and mental health is affected more by his social environment than by factory conditions. His output is greater if his health is preserved, if he does not become overtired, and if he can properly relax mentally and physically when he is away from the factory. A special correspondent to the *Times* describing current conditions in industry [7] suggests that if workers come to feel that the aim of welfare work is solely to increase output they will mistrust it and with reason. They would scarcely let doubts of the kind influence their present drive, but they will expect the state to prove, when the acute need is past, that this interest in the workers is not temporary and utilitarian. What we do now must be the first step in a maintained advance. As doctors we are not concerned with the politics of it; we know that welfare work, well devised and tactfully carried out, means a gain in health. But the problem is not entirely one for the welfare worker.

As far as grown men and women in an industrial town are concerned, the problem is largely solved if comfortable billets can be found for them. There are cinemas, public houses, working men's clubs, the social organisations of churches and chapels, public libraries and all the other amenities of a town available to them. They probably will not lack a chosen recreation, but they may lack the comfortable billet. Many industrial towns are now so overcrowded that living conditions cannot fail to be uncomfortable and bad for health. No welfare worker can alleviate this. The only way to overcome the difficulty is to provide more houses, either permanently or temporarily, and that is a job for the Government. One way to make up for uncomfortable quarters is to provide places where people can meet and eat and amuse themselves, and if the working men's clubs are roomy enough to cater for the influx the men at least will be supplied. Private people, too, in some places are throwing open a room for workers, in which they can spend their leisure time; a furnished sitting-room with writing-tables, books and papers and a fire always going makes a pleasant resort for those who like to spend their evenings quietly, and a hundred such rooms in a town might easily provide accommodation for a thousand people. Young people under twenty, however, will need a good club; and this is not so easy to provide. Military authorities and other Government departments have taken over houses and property for military purposes and for billeting troops, with the result that recreation halls and clubs for young people are no longer available for civilian use. Quite simple clubs will serve in an industrial town, houses perhaps in an old army hut, provided that a capable person is in charge. Separate clubs are needed for boys and girls, though they would be able to meet for dances and social evenings. Communal feeding of workers is already provided in the canteens of large factories, and the number of factories with well-equipped and comfortable canteens is rapidly growing. The provision of canteens in all works could, of course, be made compulsory if this seemed an advantage. In the last war the Ministry of Munitions had canteens provided in all the industries for which it was responsible. It should not be difficult to keep the canteen open for workers in the evenings if they liked to use it, and in towns many little eating-houses cater for those who prefer to eat outside the works. The difficulties of married women in industry are lessened by the provision of day nurseries for their children.

In country districts the picture is different. Billeting of workers presents a difficult problem, and once local accommodation has been exhausted can be achieved only by building homes for them or by providing transport to places where lodging is available. Neither task comes within the province of the welfare worker. Transport at present is often inadequate. We have heard of workers who leave home at 5.0 A.M. and travel two hours to get to work, returning at 9 or 10 at night. Few people can stand this sort of strain for more than a short time without a breakdown. Little attempt has so far been made to relieve traffic congestion by staggering hours of work, though this has been promised. In most places workers pour out at the end of the day, sometimes from several factories in the same area, and struggle to find seats in trams and buses which offer targets to enemy aircraft. Once difficulties of billeting and transport are overcome

3. Banks, H. S. *Lancet* 1939, **2**, 921.
4. Williams, D. and Brinton, D. *Ibid*, 1940, **2**, 482.
5. H.M. Stationery Office, October, 1940, 2*d*.
6. Vernon, H. M. Health in Relation to Occupation, London, 1939.
7. Oct. 18.

the problem of recreation in country districts is not serious in summer; people who have been in a factory all day will then gladly spend the evenings in country fields and lanes, but for at least five months in the year they must have some indoor recreation. Probably the adults would like something which captures the club atmosphere of the public house, a place where they can sit and chat with other people, play an occasional game of darts or dominoes and get a drink if they want it; but it must also be a place where the man who does not want to drink will not feel out of place. A room should be reserved for women, and they would of course be allowed to go into the other rooms if they wished. A central club of the kind would not be useful if people were widely scattered, and in that case it becomes doubly important to provide them with comfortable billets where they can find their own recreation; if their billets are uncomfortable they are very hardly done by indeed.

A club room is as necessary for the young people in a country district as in a town, perhaps more so. An army hut or a village hall can be used, some kind of entertainment or attractive gathering being offered every night, including Sundays. Whist-drives, dances, concerts, social evenings and cinema performances are always popular; libraries of substandard films are now available and the travelling cinema can provide the projector. E.N.S.A. will no doubt arrange performances. Lecturers on politics or subjects of general interest are sometimes welcome.

Welfare workers must therefore have a wide aspect of their task in mind. Where social work has developed gradually in an industrial neighbourhood the problems have been difficult enough and not all of them have been solved; but those who start from scratch to establish it in a newly fledged war industry must be people of imagination and insight. They should know how the workers live, and once appointed they should be given a free hand because efficient and sympathetic welfare work cannot be carried on by rule-of-thumb methods. But behind all welfare work are problems of billeting and transport, and unless these are solved first—or at least concurrently—the welfare workers will labour in vain for the health and recreation of the industrial army.

Public Health

INCUBATION AT 44° C. IN THE EXAMINATION OF WATER-SUPPLIES

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THE capacity to produce acid and gas in MacConkey's fluid medium at 44° C. as characteristic of true *Bacterium coli* in water has been accepted by several workers since the report of Wilson in 1935, and is advocated, though with caution, in the Ministry of Health report of 1939. Raven and others (1940) find the test very reliable for the waters in the Liverpool area, for the number of other organisms reacting in this way was small.

In the North-East Derbyshire area, on the other hand, the test has been found of little practical value since many of the members of the intermediate-aerogenes-cloacæ group found in the waters of this region also produce acid and gas at 44° C. From amongst these waters two which are not used as drinking water are given as examples since they show the local conditions in an exaggerated degree. Both waters give consistently high readings of the presumptive *Bact. coli* count at 37° C., ranging from 5–10 per 100 ml. in dry periods to the limit of determination during wet weather. Examination of the collecting areas shows that it is extremely unlikely that either receives any contamination from human sources, and on no occasion during a period of two years have typical *Bact. coli* been isolated from these waters. During the past three months parallel series of samples of these waters have been incubated each week in MacConkey broth 37° C. and at 44° C. The presumptive *Bact. coli* count obtained at 44° C. has every time been either the same as that at 37° C. or but slightly lower. On each occasion several of the cultures at each temperature have been plated out and some half-dozen colonies picked off from each plate. These isolated organisms have been tested according to the scheme given in the Ministry of Health report (1939), and in no case have typical *Bact. coli* been found. A different organism or variant has been consistently obtained from each of the waters; that from the first gives a positive methyl-red reaction, a negative Voges-Proskauer reaction, grows readily in citrate, does not form indole, produces acid and gas in MacConkey's medium at 37° C. and at 44° C.; that from the second gives similar reactions except for a reversal of the results of the methyl-red and Voges-Proskauer reactions.

Similar findings have been obtained with some organisms isolated from other waters in this area. Thus although we have never failed to get gas-production at 44° C. with typical *Bact. coli* this test alone is not sufficient for presumptive identification in this area.

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Brucella Infection

THE discovery of *Brucella melitensis* in the milk of some cows in a Midland herd, revealed by Mr. F. W. Duke in his short article in our issue of Oct. 26 (p. 517), may cause some uneasiness, for, of the three known species of brucella, melitensis is by far the most dangerous to man. Though somewhat locally distributed, *Br. abortus* is not uncommon in milch cows in Britain, and since most milk in this country is still unpasteurised infection of man by that organism must be frequent; yet though we have been on the lookout for human brucellosis for several years the number of cases recorded is small. The disease of man caused by *Br. abortus* is, however, very indefinite and doubtless many atypical cases occur in which their true nature is not suspected. Man is much more susceptible to *Br. melitensis*, proved by Bruce in 1887 to be the cause of what was then known as Malta or Mediterranean fever, a disease which was by no means uncommon until it was found to be spread by goat's milk and readily prevented either by avoiding goat's milk or by boiling it. So far as we know, *Br. melitensis* has never been found in goats in this country, and since cows are supposed not to harbour this species its discovery is surprising and unwelcome. The fact that no case of human Malta fever has been recorded in this country suggests that the passage of the organism through cows may reduce its virulence to man, but in the south-east of France there were numerous instances in which a cow became infected from neighbouring goats, excreted *Br. melitensis* in its milk and gave rise to cases of typical undulant fever in human beings. There is, of course, the possibility that melitensis infection might spread to our goats where it would find its normal host. The Brucellosis Melitensis Order of 1940 is fairly drastic so far as it goes, but its provisions can be applied only after the organism has been discovered, which might be not until a human outbreak of disease had occurred. But since all species of brucella are destroyed by pasteurisation we have an obviously efficient means of prevention so far as commercial milk is concerned.

Epidemiologists have for some years recognised the possibility of *Br. abortus* producing an epidemic disease of man of some consequence, because of the known danger of *Br. melitensis*; but up to now epidemics of the latter have not been considered. Malta fever is less likely to be missed than abortus fever, for it is usually more severe. If the disease is suspected the diagnosis can be settled by the serum reaction, and it should now be a routine in cases of continued fever in which Widal reactions are sought to carry out the examination for the brucellosis reaction if that for the typhoids is negative or inconclusive.

Infectious Disease in England and Wales

DURING THE WEEK ENDED OCT. 19, 1940

Notifications.—The following cases of infectious disease were notified during the week: smallpox, 0; scarlet fever, 2149; whooping-cough, 1499; diphtheria, 1347; enteric fever, 37; measles (excluding rubella), 11,229; pneumonia (primary or influenzal), 732; puerperal

(*Continued at foot of next page*)

In England Now

A Running Commentary by Peripatetic Correspondents

IN war-time the divine faculty of imagining yourself in someone else's place is apt to be swept away by a barbaric horde of emotions. I knew an old country doctor who had a passion for seeing the other man's point of view and used to make a game of it. If he came back from a meeting of the town council at which there were six people present he would think afterwards in hexagons, putting himself at each angle in turn. "Now let's get into the sanitary inspector's corner and see what he was thinking; now the mayor's." Ordinary visits would involve the consideration of a triangle, the patient's, the relative's and his own point of view; consultations, a square. Nor did the old doctor confine himself to human relationships. It was from him I got the idea of looking at a bacterial toxin from the bacteria's point of view—a ferment which, like propaganda and fifth-column work, goes ahead to prepare the soil for easy conquest and expansion. Similarly he looked on digitalis not primarily as a useful drug but as a poison the clever foxglove had made to keep off browsing kine.

We sometimes forget the intensely tragic nature of senile dementia. It is so common we are habituated to it; so like a physiological process we take it for granted; as far as I know no sufferer has ever written championing it. On the contrary its usual reception is the mocking smile, the taunt-tinted phrase, the superior amused condescension, which make one feel that man has not advanced much beyond the fowls that pick at their sick one's sore. Cancer has its heroics, tubercle its melodrama, but the old lady fighting a stubborn rearguard action against senile dementia—cut off from help, her own side ashamed of her, fighting a slow vegetative eating-away, not toxicated as in the acute diseases but on the contrary with occasional moments of acute insight when she sees the battle in cruel perspective, hopeless, helpless, ridiculous, intensely humiliating—only gets a jeer. It seemed so innocuous when it started—a lengthening of normal forgetfulness, an increase of ordinary hesitancy. Then "Where am I?" or "What is today?" or "What was I doing after breakfast, no, I mean, dinner?" Later on it gets to be commented on by one's dearest, who feel one's humiliation so deeply: "Oh, but, my dear, I've told you a dozen times . . ." Enmity may come in here, the most revolting hate in the world because it is transmuted love. Then to cover up the more glaring lapses the old lady makes up fables to explain them. "I'm sorry to tell you, doctor, she's becoming terribly untruthful, so unlike her." The old lady is fighting for more than life now, her place among the sane, and the fight goes on for years. One consolation she has, an old scrapbook of memories, but even here the pictures on the last pages are fading. Ordinary bodily needs are forgotten now, but sometimes realised; dirty clothes are hidden and poorly hidden. "Faulty habits," says the nurse; "secretive," writes the doctor. Then in one of her brief periods of perception she realises how she is being treated as less than human and gets furious. "They're after my money," "my house," "my cottage" or even "my teapot." "Unmanageable," says the relative. "Give me my keys, I shall do my own shopping." "Violent at times," writes the alienist. She tries to explain, but although the intonation gives an idea of her feelings the words tumble into and over each other. She's back to the stage of the animals who by growls or barking can convey their feelings but not precise information. It is the great primordial battle in reverse; once some speck of spirit that has grown to be ours fought its way into the animal world from the vegetable, now it is being driven back, fighting.

* * *

We have had two proper air-raids here in the middle of the night, and I had an hilarious time. The whole hotel have decided to have my room as their air-raid shelter, so they all come in here and array themselves round the room and keep me amused. They are a very mixed but gay crowd, and we make a terrific din and really enjoy ourselves—in fact the last time we made so much noise that we didn't know whether the "all-clear" had gone. You should see the array of trousers and hair curlers that arrive, really stunning!

The writer of that letter is a girl who broke her back in a motor accident a year ago. She is in a hotel under an osteopath and talks about the time when she will again walk up the steps of the institution where she is employed as a clerk. She was taken to one of our leading orthopædic surgeons who advised a laminectomy in the faint hope that it might relieve the pressure; it failed to do so. Another orthopædic surgeon saw her and confirmed that she could never walk again; it was then that she went to the osteopath. One cannot blame her for that—hope springs eternal in the human breast—but is it right to allow that hope to be misdirected? To guide it into a determination to lead a useful life from her bed would be better than to let it aim at the impossible until it becomes the hope that maketh the heart sick; by which time the mental effort will, in all probability, be spent and no longer be available for her to face life. My point is that when a patient is incurable in one part of the body, but may have long life ahead, the first thing is to get him or her to face life with the disability. She is talking of the day when she will walk up the steps to work to do her shorthand typing again. If she would face being carried in she might be able to do her shorthand and typing from a wheeled chair. But so long as she looks forward to walking again, she will never face life as a cripple. It is as though a one-legged man thought he could grow a new limb like a lobster. And so we may blame those who allow such a one to get, under these conditions, into an osteopath's hands. If a bomb fell outside the famous institution where she works, and, without destroying it, caused it to settle at one corner and lean over like the tower at Pisa, they would call on their engineer and he might say he thought it was worth trying to push it up again, but without much hope of success; and if he failed they might ask a consulting engineer for another opinion. But if *he* reported that it would stay put, but that nothing would push it up again, they would not go to someone else with a physics based neither on Newton or Einstein but on some strange principle of his own; nor would they believe him if he stated that he could lift the building up again by re-wiring it within and pointing it without. Yet that is what they do when they allow and even urge such a patient to go to an osteopath. With the building it would only mean a loss of money; with the patient it means the injury to a human mind. This would not matter so much if it were near extinction by an advanced consumption of which the patient did not know. But when it is one which may continue for many years and might if rightly guided be, in spite of physical disability, of use to the community, it seems to be wrong and even cruel.

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With the world lousy with pyrotechnic displays you would have thought that the children would be willing to forgo fireworks this year, but such was not the case. The fact that outdoor fireworks were not possible was reluctantly accepted but it was hastily pointed out that the ban did not extend to the indoor variety. Accord-

(*Continued from opposite page*)

pyrexia, 144; cerebrospinal fever, 144; poliomyelitis, 36; polio-encephalitis, 0; encephalitis lethargica, 2; dysentery, 47; ophthalmia neonatorum, 86. No case of cholera, plague or typhus fever was notified during the week.

The number of civilian and service sick in the Infectious Hospitals of the London County Council on Oct. 25 was 1414, including: scarlet fever, 274; diphtheria, 248; measles, 415; whooping-cough, 41; enteritis, 65; chicken-pox, 112; erysipelas, 40; mumps, 9; poliomyelitis, 2; dysentery, 2; cerebrospinal fever, 25; puerperal sepsis, 6; enteric fevers, 16; german measles, 6; other diseases (non-infectious), 78; not yet diagnosed, 75.

Deaths.—In 126 great towns, including London, there was no death from smallpox or enteric fever, 2 (0) from scarlet fever, 8 (1) from whooping-cough, 25 (0) from measles, 44 (1) from diphtheria, 38 (5) from diarrhœa and enteritis under 2 years, and 14 (3) from influenza. The figures in parentheses are those for London itself.

Fatal cases of diphtheria were scattered over 25 great towns; Liverpool reported 7 cases, and Plymouth 5. There were 16 deaths from measles at Liverpool.

The number of stillbirths notified during the week was 217 (corresponding to a rate of 37 per thousand total births), including 13 in London.

ingly, a wet Sunday afternoon was set aside and prematurely blacked out and a terrific time was had by all with sparklers, lightning papers, serpents, vesuvii and what used to be called Bengal Lights but are now known by a more topical name. There were also some small hand-grenades fashioned in the likenesses of apples, pears and bananas which on being ignited spurted jets of coloured sparks and finally popped open with a quite unalarming bang to disgorge wooden whistles, brooches, napkin rings, paper caps and what not. Personally I think vesuvii are a sound line. Sparklers are good but one is very like another and after a time they tend to pall. On the whole I like serpents best; they easily head the list for evil-smelling smoke and I should urge Dr. Twort and Mr. Baker to inquire into its bactericidal effect. If serpents were brought into the shelters I am pretty sure that no pathogen would stay long. Few of the human inmates would stay long either and hence the problem of overcrowding would also be solved. There was a time when, by a sort of divine right of fathers, I used to do all the setting off but nowadays I have to muscle in hard to get even a sparkler to myself.

* * *

I have just been entertaining for the week-end a friend from London and his wife who have taken Lord Horder's advice to try a change of air and company. The man admits to having slept more soundly than he had done for many weeks, enjoying the absence of both friendly and foreign noises. But what if he were quite frank he would be saying to me is this:

"I felt a little out of tune with my new environment—with, dare I say it, the air of smug self-satisfaction that seemed to pervade the ancient town. The cakes piled high in the shop-windows, the concern of the inhabitants over their little comforts or the best means of preventing billeting, the oft-told tale of the month-old bombing, and the look of horror at our suggestion that a few well-directed bombs might help to modernise the sanitation of the place, all added to the sense of irritation. I got rather tired, too, of hearing from casual visitors to London that really the damage there was amazingly small. I thought of my own small department, of whom one in three have already had first-hand experience of bombing, and by Monday I was feeling something of what many of our Tommies must have felt when home on leave in the last war—a strong desire to be back again in the front line with all its perils and discomforts."

And I should be replying if I were equally frank: "I dunno whether your picture is right or wrong. Whether it is a product of air-raid morbidity or a flash of insight into us as we really are. But of one thing I am sure. Another couple of days here would cure you of your bomb snobbery."

* * *

I made a discovery about smells last week. I was going past our village church when I walked into a most lovely smell. I hunted about for a bit and eventually found twenty yards away one small spike of winter heliotrope. It is common by stables and churches because horses love it; presumably in carriage days it kept them quiet during long sermons. It didn't smell very strong and I vaguely wondered that I had nosed it so far away. A few days later I went into a cottage "best room" and again found a lovely smell. I looked round; there was only one plant among the pots in the window that was in flower—a primula wanda. I put my nose to it, it smelt only faintly, yet obviously it was where the smell was coming from. Then it dawned on me that some scents act at a distance; they have to be diluted to, say, one in a million, or oxidised before they are seductive to the human nose or the insects' antennæ or spiracles; a clever come-hither mechanism which probably acts at distances inconceivable to our gross turbinates, a cry for pollination, a sex appeal through an intermediary. The female of homo sapiens has stolen this cunning mechanism from the flowers for the same purpose, but with no intermediary, thank you. Now we come to another point—the scent of some flowers isn't nearly so pleasant or strong close to them; there is a sort of neutral zone very near the flower where there is hardly any scent at all. Is that why Mrs. A. has never discovered she has bromidrosis, and why Mr. B. says he has not got pyorrhœa?

Letters to the Editor

ANÆSTHESIA IN THE SHOCKED PATIENT

SIR,—The M.R.C. war memorandum on wound shock has a one-sidedness of approach to the subject of wound shock which culminates in a serious omission. Concentration on the hæmodynamic aspect of shock has resulted in a final dangerous statement on anæsthesia:

"Gas and oxygen, combined with ether if necessary, is the anæsthetic of choice . . ."

Recent work suggests that the use of local and regional anæsthesia is of primary importance in these cases. A. K. Henry [1] agrees with Abdelsamie's conclusion that emergency amputation of limbs under full Novocain analgesia "is a benign measure that does not shock the patient." Abdelsamie [2] noted that during amputation on a "poor risk" any painful, unblocked stimulus tended to make the pulse imperceptible; with full analgesia, on the other hand, the pulse remained unaltered and indeed would sometimes improve. Further evidence now comes from the Soviet Union. G. M. Novikov [3] records observations on 3180 patients (37·5% traumatic cases) operated on under local anæsthesia and considers that local anæsthesia itself was a factor which diminished shock. Psechniknikov [4] records his observations on the basis of the experience of a team of surgeons during the Finnish campaign who investigated the possibilities of local anæsthesia in war surgery. At the beginning of the campaign the surgeons all used general anæsthesia, but Psechniknikov began to use local anæsthesia for all his cases. With two tables in action it was easy to compare the condition of the patients operated on under general or local anæsthesia. When local anæsthesia was used the patient came out of the shocked condition while on the table. It was further noticed that the operating time in these cases was not appreciably lengthened.

On the basis of this and other available evidence we urge a reconsideration of the method of anæsthesia advised in the memorandum, and further exploration of the use of local anæsthesia in the prevention and treatment of wound shock.

RUSCOE CLARKE,
LIPMANN KESSEL.

London.

THINGS TO COME

SIR,—On two recent occasions you have shown a lively appreciation of the changing conditions of the medical world and a fearless readiness to indicate lines of a possible constructive policy. The fact that you have been ready to draw attention to the new situations and put forward suggestions which a few years ago would have been regarded as revolutionary has been encouraging to the increasing number of us who are acutely and gladly conscious that a chapter is closing and a new one is shortly to be opened.

One of your correspondents wrote that he "rubbed his eyes" as he read one of your leading articles. It is typical of the dwindling body he represents that a suggestion of profound changes in the world in general and medicine in particular, with the consequent need for radical readjustment, should cause rubbing of his eyes. In all the epochs of changing history there has existed the small firm minority unable to see the deep implication of contemporary events, and now again, as always before, we meet the same opposition to reform. To most of us it is strange that they can contemplate and admit the upheaval and overthrow of so much that has formed the systems and customs and institutions of our lives hitherto, and yet be unable to see that the small world of medicine cannot escape its own share of similar disturbance.

We, as a people, are in the grip of massive events, and whether we like it or not, we as doctors shall be compelled, by forces far stronger than we can control, to re-adapt the whole of our system to the new social pattern. A readiness, first to see, and then willingly to

1. *Lancet*, 1940, **1**, 736.
2. Abdelsamie, L. *Ibid*, 1936, **1**, 187.
3. *Surgery (U.S.S.R.)*, 1940, No. 4.
4. *Soviet Med. (U.S.S.R.)* 1940, No. 56.

coöperate in re-adjustment in accordance with the demands of the changing world will ensure high justification for the profession, and service for the people. But a refusal to coöperate in the new form of social life which will soon emerge from the fire of war will impair the driving energy which medicine could employ in building an age of health, perhaps unimagined by the blinkered vision of today.

This is not the place to describe or even suggest in detail the form of a new medical service. The general principle, which must arise from a totally new outlook on health, must come before the detail. The characteristic activity of this closing medical epoch is its emphasis on the treatment of existing disease. We wait and watch for disease to appear, ready to devote ever-increasing knowledge and skill to its cure. The idea of health as a form of beauty and necessary for physical, moral and even spiritual exhilaration, scarcely enters into our thoughts. We do not yet regard the large mass of illness with a sense of social shame as we look on material ugliness. Complacently we see ill-health and sub-health around us as a necessary evil, but a new consciousness of the scandal of preventable disease would turn our energies into the direction of prophylaxis and the final eradication of the fundamental causes of ill-health, whether they be social or individual.

Those who are soon to consider a scheme for the "Future of Medicine" will have to concern themselves with far more than the details of conditions of practice, hospital politics, and other similar items which form the body of most suggestions for a medical service. Medicine must first proclaim the futility of employing most of its energies in treating end-results, and put forth a new enthusiasm for prevention, by an attack on all the many fundamental social evils out of which so much disease arises. It must teach the ideal beauty of health and the ugly cruelty of disease. Concentration on the paramount necessity of prevention must be the characteristic of the new world which is coming. The new emphasis on positive health will afford medicine a place of dignity and opportunity for service in the state second to no other. Let us see to it that we shall be ready.

London. ALECK BOURNE.

ASCORBIC ACID AS AN INDEX OF NUTRITION

SIR,—I feel I owe Dr. Leslie Harris some apology; his article on ascorbic acid as an index of nutrition was confined to this subject and his context did not refer to other criteria. I was therefore wrong to accuse him of making this criterion the "sole" one of dietetic adequacy. But his criticisms of my doubts as to the necessary amounts of ascorbic acid required to maintain good health and to prevent scurvy are not radically satisfactory. He brings forward the very prolix article of W. Stepp and H. Schroeder (*Klin. Wschr.* 1939, **18**, 414) in criticism of Rietschel's first experiment (*Ibid*, 1938, p. 1787) that the absence of scurvy did not postulate that health otherwise was good. Of the two later experiments which especially tended to show that scurvy was absent and that health was excellent Stepp remarks in a footnote that he had nothing further to add. I doubt too the validity of his stricture that recent political trends in Germany may have orientated scientific research; after all, he accepts Stepp's evidence in his favour. But until these three experiments of Schick, Mensching and Rietschel have been proved fallacious, they should be accepted at their face value.

But I should not have intervened if this German evidence was not supported. Dr. Harris and Dr. Russell Martin both point out that arctic travellers may and do eat large amounts of meat and so may absorb a sufficiency of ascorbic acid even to satisfy the committee of the League of Nations. This may be so or not. Taking 0·75 mg. % as a very liberal flesh value for ascorbic acid (muscle 0·5 to 1·0, fat nil, viscera 2, brain 4 mg. %), to obtain the alleged optimum, in view of the fact that much fat was eaten, they would have to ingest over 4 kg. or 9 pounds of flesh daily; the records show that they actually ate a little over 1 kg. More disturbing is the analysis of the treatment of active scurvy by fresh meat as practised by Dr. Grieve at Harbour Bar, Labrador (1909–11). In the treatment of scurvy with ascorbic acid large doses are used, 100 to 200 mg. daily or oftener. To get these amounts in the meat cure, he would need to prescribe 14 to 28 kg. of flesh each day. It is quite impossible to believe that a subject of scurvy with his sore mouth, loose teeth and anorexia would be able to ingest even 1 kg. a day. He also states that experiments such as I suggested have already been carried out; if so they have escaped my observation. I have seen many accounts of experiments chiefly on children previously fed on irrational and usually inadequate low-class diets which then were supplemented with milk, cod-liver oil, &c. This is not what I suggested. Let varied, but adequate, diets be compared.

I have pointed out that there is evidence that diets almost completely lacking in vitamin C are yet consistent with good health and immunity from scurvy; secondly, that active scurvy may be successfully treated by a diet in which vitamin C is scanty. Can we reconcile the different viewpoints? Scurvy would appear to be due to two main factors: (*a*) mild catarrhal infections, especially of the respiratory tract, and (*b*) toxic substances engendered in the preparation or preservation of foods which prevent optimal protein metabolism as regards hæmatopoiesis and vascular stability. Ascorbic acid in excess appears to be able to neutralise this (*b*) factor and so prevent or cure scurvy. The German experimenters and the arctic travellers escaped scurvy and maintained good health by avoiding this (*b*) factor and Dr. Grieve cured scurvy in the same way.

It follows that Dr. Leslie Harris and the League of Nations' committee advise diets rich in vitamin C so that undetermined toxic elements in the dietary shall be neutralised. Hence my objection to it being a criterion of dietetic adequacy. It is a primary rule in toxicology that it is wiser to prevent the ingestion of poison than to make the antidote available.

Bristol, 8. A. T. TODD.

VIRUS DISEASES ACQUIRED FROM ANIMALS

SIR,—Professor Bedson in his interesting address published in THE LANCET of Nov. 9 (p. 577) states that indubitable human infections with Rift Valley fever have been confined to laboratory personnel. It should, however, be recalled that in Kenya, during epizootics of Rift Valley fever in sheep, Daubney and his co-workers have noted on more than one occasion attacks of febrile illness among shepherds and others in close contact with infected flocks. Immune bodies to Rift Valley fever virus have subsequently been found in the sera of these persons. In addition immune bodies to Rift Valley fever virus have been found in the sera of natives from Uganda, the southern Anglo-Egyptian Sudan, French Sudan and French equatorial Africa, but not from the west coast of Africa (*Bull. Soc. Path. exot.* 1936, **29**, 986). There is of course no evidence that under natural conditions men have been directly infected by animals suffering from the disease, but neither is this evidence available in the case of equine encephalomyelitis. In both diseases infection is apparently spread both to animals and man by insect vectors.

G. M. FINDLAY.

Wellcome Bureau of Scientific Research, London.

A SALVAGED UTERUS

SIR,—One day last week a medical officer brought me a uterus which appeared to have been removed by the usual surgical method. Except for some discoloration of the vaginal cuff, there was nothing to distinguish it from the result of any total hysterectomy. The agent, however, was different. The specimen had been picked up by salvage men sorting the debris from an Anderson shelter which had housed two women when struck by an aerial torpedo. Other remains were few and fragmentary, and were hardly to be distinguished from the earth in which they lay. Of all the soft parts this uterus alone remained intact, its survival being probably due to the reinforcing effect of several small interstitial fibroids. The interest lies in the extraordinarily close resemblance between the action of blast and of surgery, the orthodox reflections of peritoneum and the clamping of the fallopian tubes having been faithfully reproduced by the explosive force.

My thanks are due to Dr. H. R. Segar, medical superintendent of this hospital, for permission to report this case.

Wellhouse Hospital, Barnet. E. M. MARTLAND.

THE CHEAP MILK SCHEME

SIR,—Members of the medical profession have warmly welcomed the milk scheme of July 1940 because it represents a very real advance in our social legislation, the more noteworthy since it has happened in time of war. Perhaps the main implication of the scheme is that the Government now accepts a special responsibility for the nutritional care of the mothers and young children as such. There is wisdom in this appreciation of their value to the nation and the special care they require. The Children's Nutrition Council has always pressed for such a policy and views it with satisfaction. This satisfaction must, however, be tempered by an appreciation of certain facts.

First, coincident with the presentation of the scheme there was a rise in the price of milk in Scotland from 3*d.* to 3½*d.* per pint, and this was later followed by a further rise to 4*d.* per pint. Secondly, since only 8% of the population are eligible for the scheme, it follows that 92% are paying considerably more for this milk than previously. Past experience has shown that such increase in price means decrease in consumption. It is hoped, however, that the considerable increase of milk consumption under the scheme will balance the expected fall in the ordinary priced milk. This larger category includes, of course, most of our invalids and convalescents, our old-age pensioners and our adolescents, categories which should be included in any future development of the scheme.

The immediate aim of this letter is to urge a greater appreciation and use of the scheme as it stands. We appeal to practitioners, and especially to Scottish doctors, to use their wide contact with mothers and children to achieve, as near as possible, a 100% use of the milk scheme. It is of interest to notice and compare the acceptance of the scheme in different parts of Great Britain on Sept. 11. In England 67% of possible users were in the scheme; in London 86%; in Scotland 42%; in S.E. Scotland 54% (more recently 70%); in Edinburgh 60% (more recently 70%); in Glasgow 44% (more recently 55%). In view of the importance of milk consumption as a public-health measure, we in Scotland cannot be gratified at our slowness in achieving a fuller use of the scheme. Do the figures mean that the coördination of our public-health services is less advanced than it is in England? The fact that our infantile mortality rate stands at a figure lamentably higher than that for England may well be linked up with such factors.

Our council therefore appeals to the doctors in Scotland to coöperate to the fullest extent with the Government milk officers, who will gladly supply copies of the application form. The administrators of the scheme are anxious to stress the fact that, while the free milk is for people of certain income levels, the cheap milk at 2*d.* a pint is meant for the use of all expectant mothers and children under five irrespective of income, and that it is a citizen duty to use and encourage its fullest possible use.

ERIC F. DOTT,
Chairman.
J. LIPETZ,
Secretary.

Children's Nutrition Council (Edinburgh Branch).

THE MEDICAL PLANNING COMMISSION

SIR,—Recent correspondence indicates that there is general agreement, at any rate among the consultant section of the profession, that the panicky measures regarding the E.M.S. taken by the Ministry of Health at the outbreak of war—upon the advice, as the 8th report from the Select Committee of National Expenditure demonstrates, of the Central Emergency Committee of the B.M.A.—are indeed a "direful spring of woes un-numbered," both to the profession and to the public. It is therefore I think important to point out, especially to my fellow-consultants, that there is now a movement by the B.M.A., which has already made considerable advance, to establish a "Medical Planning Commission" to consider important problems of reconstruction and reorganisation in the field of medicine in the post-war era. The sense of proportion displayed by those responsible for this movement may be illustrated by two recent acts. The Parliamentary Medical Committee, comprising some round dozen members of Parliament who happen also to be registered medical practitioners (and I am at the moment the only member of this committee holding consultant status) was invited to appoint two representatives upon this commission. I understand that the Royal College of Physicians of London, with a roll-call of over 300 fellows, was also invited to send two representatives.

Unless consultants are more watchful now than they were a year ago they may, I submit, find themselves again the victims of the irresponsible action taken by a body which is grossly unrepresentative of their interests. May we not also hope that the Royal Colleges in London, which I think are rightly regarded as the official guardians of the interests of the consultant section of the profession, will bestir themselves to make their influence felt, and offer some counterpoise to the claim made by the B.M.A. that it "represents" the profession and that it has the sanction of the Ministry of Health and other Government departments for this more than questionable claim.

Wimpole Street, W.1. E. GRAHAM-LITTLE.

TOXOID IMMUNISATION

SIR,—In his letter of Nov. 9 Dr. Baynton Forge misleads by stating that the official health services disseminate the idea that toxoid immunisation for diphtheria is a "perfectly safe procedure." They stress the fact of its efficacy and point out that the evil effects are small compared to the good done. Some deaths may be ascribed to diphtheria immunisation but these are very rare and when compared to the number of lives saved are relatively insignificant. I am inclined to agree with him on theoretical grounds that the carrier-rate may be increased but whether this actually occurs is another matter. Even though it did it would not be such a great evil in an immunised population, for small latent infections help to maintain the immunity. If immunised people living in a non-immunised population are a theoretical potential danger to the rest, that is a reason why the whole of the susceptible population should be immunised. It is difficult to assess the significance of Dr. Forge's cases because no particulars have been given of the actual toxoid used, technique employed, dates of injections, &c. It would be interesting to know if the swabbing of the carriers was checked by virulence tests, and if his "carriers" were post-Schicked. Most competent authorities would agree that a suitable toxoid,—e.g., A.P.T. for children under the age of nine and T.A.F. for the others—given according to a sound technique should not be lightly discarded in times like the present for vaccines of doubtful value.

Swansea. G. E. DONOVAN.

ONE OR TWO?

SIR,—I congratulate your peripatetic correspondents upon their excellent series of articles, but I must challenge the statement of your correspondent who, in THE LANCET of Nov. 9, maintained that man is striving after unity in his paired organs. Since the days when we were primitive fish we have acquired several new paired organs. When we decided to breathe air instead of water we relinquished our gills and developed two lungs. Our reptilian ancestors were dissatisfied with the mesonephros of fishes and amphibians and replaced it by a new kidney (the metanephros) which is also a paired organ. Our cerebral cortex, of which your correspondent writes at some length, consists very largely of the neopallium, which only began to grow on a big scale in our recent mammalian ancestors. These ancestors were careful to develop the neopallium in duplicate, though admittedly most of us use one hemisphere more than the other. I feel that we should think long and carefully before reversing the policy of our ancestors of having spare parts when possible. I must confess that I do not envy the one-armed crab which is admired by your correspondent. Incidentally, I have a strong suspicion that Naughty Jane and her friends exist in both cerebral hemispheres and cannot therefore be removed by taking away half the cerebrum.

West London Hospital. W. A. ELLIOTT.

MISUSE OF TANNIC ACID

SIR,—The attack on the use of tannic acid in a leading article last week must come as a surprise to many. I suggest that this so-called failure of tannic acid is due either to the failure of those using it to do so properly or, in the case of hand burns, to the irreparable damage done by the initial burn.

To apply tannic acid to a severe burn and leave it at that is as unreasonable as to expect a mobile joint after an arthroplasty if no after-treatment is carried out. Tannic acid cannot be expected to produce epithelium like magic over a large third-degree burn. Skin grafting will practically always be necessary, but surely this is no condemnation of tannic acid which does most effectively overcome the shock and frequently leaves a granulating surface ready for further treatment; even if sloughs are present I doubt if preliminary tanning *for about a fortnight* has done anything but good. The patient's general condition will have greatly improved and a healthy granulating surface suitable for skin grafting is no more difficult to obtain now than it would have been if tanning had not been carried out.

Turning to burns of the hands one very obvious point which has received no mention is the damage caused by the burn being so great, in some cases, that restoration is impossible by any method. The danger of ischæmia from œdema is readily avoided by confining tanning to the anterior and posterior surfaces of the fingers until tissue swelling has subsided. Thereafter complete tanning may be carried out with satisfactory results. Contractures must be combated by splinting, skin grafting and movements if tannic acid is used, as with any other treatment, but if they occur it is the fault of the surgeon, not of the tannic acid.

The heading "Misuse of Tannic Acid" is more appropriate than the text of the article. Many surgeons who regularly treat burns with tannic acid obtain as good results in burns of the hand and face as elsewhere. To them such dogmatic phraseology as "tannic acid must never again be used for burns of the hand and face" seems strangely out of place.

London, E.9. W. D. PARK,
Surgeon, E.M.S.

PATHOLOGISTS AND THE E.M.S.

SIR,—As some of your correspondents are bringing to light instances of the unsatisfactory way in which present E.M.S. salary arrangements may work in practice, may I call your attention to the anomalous position of many of the pathologists on the staff of London voluntary hospitals? They, of course, signed a contract similar to that referred to by Dr. F. W. Roberts in your issue of Nov. 9. For nearly a year they carried out the laboratory work for many E.M.S. cases, organised local blood-donor panels, collected blood for storage, and were responsible for transfusion equipment. Soon after air-attacks on London began, and casualties in large numbers arrived, their contracts were suddenly terminated. Their E.M.S. work in connexion with transfusion and civilian war wounds had nevertheless to go on, and on inquiry they learned that their own hospitals were henceforth responsible for their remuneration. This might have made no material difference to them in peace-time if their appointments to those hospitals had been full-time ones and remunerated accordingly; actually many London pathologists who in signing their E.M.S. contracts resigned outside appointments and gave up private practice now find themselves back on part-time honoraria, yet taking full-time hospital responsibilities and having no means of making good the financial deficiency. Meanwhile, their colleagues, in some cases more junior men who originally happened to be posted to sector hospitals outside London, continue to draw their E.M.S. salaries.

The difficulty appears to be to bridge the gulf between the voluntary-hospital system of paying nominal salaries and allowing other institutional or private work and the E.M.S. system of higher salaries and full-time posts. Apart from the anomalies mentioned, the present position of the late full-time E.M.S. pathologist also implies that, if a London voluntary hospital now happens to be put out of action, he and the pathological staff are thrown out of work. The remedy of simply transferring the pathologist from a London to a sector hospital defeats the ministry's object of saving public money. If the Ministry of Health have to reduce expenditure connected with E.M.S. pathological services it would surely be fairer for them to allocate a lump sum for pathological services within the whole sector, including the metropolitan area where casualties are likely to be the heaviest, rather than to victimise those pathologists whose services are required in the London area. The voluntary hospitals could be made to share their burden of the cost by refunding to the ministry sums equivalent to the pre-war salaries of their pathologists.

London. PLASMA.

COMPULSORY IMMUNISATION

SIR,—I am sorry that I for one cannot endorse Dr. Cunningham's plea for compulsory immunisation against such diseases as diphtheria (for all healthy school-children), the typhoid group (for heavily bombed areas), smallpox, and tetanus (for members of defence forces, &c.). I think that few medical men whose experience goes back rather further than Dr. Cunningham's, and who realise the intense opposition which compulsory vaccination aroused in many quarters at the time when a real attempt was made to make vaccination compulsory, would wish to see this country involved in a similar undignified and fruitless controversy and struggle. That it would fail in its object is almost a foregone conclusion.

As regards diphtheria, Dr. Cunningham must surely be aware that merely to immunise the child population of school age—even if one hundred per cent. could be immunised by any system of compulsion—would admittedly fail to prevent serious epidemics of the disease, so that it would certainly be necessary to include the children of pre-school age. In any case, it is very doubtful whether as large a proportion of children could be immunised under any compulsory system as is now quite possible under an efficiently conducted voluntary system. As for vaccination against smallpox, Dr. Cunningham must indeed be an optimist if he thinks compulsory vaccination would be a success; and on what grounds and for what reason would he propose to make it compulsory?

I cannot imagine any measure (if a serious attempt were made to carry it out) more calculated to bring every kind of immunisation into disrepute than that which Dr. Cunningham suggests.

Leicester. C. KILLICK MILLARD.

SNAPS FROM THE SURGEON-GENERAL'S LIBRARY

MORE than a year ago we said that the better dissemination of scientific information was an urgent problem.[1] Today it is equally urgent but much more difficult, and it is good to hear that a group of friends of the Army Medical Library at Washington have set up a microfilm service there which will make the important collections of the library readily available to research workers who are unable to visit it. The new "Medicofilm Service" will supply photographic copies on cinema film of any article which the would-be reader chooses. In this country before the war the making of microfilm records was still in an experimental stage, though the publication of J. D. Bernal's "Social Function of Science" had given it a fillip. For the last three years facilities have been available at Washington, but the new service will specialise in medical work and will operate in the Army Medical Library itself. It will be run on a non-profit basis, and the cost of labour and materials will be covered by a charge of 30 cents for each complete article not exceeding thirty pages and 10 cents for every succeeding ten pages. Lists of the 4000 periodicals filed at the library and further information may be had from Microfilm Service, Army Medical Library, 7th Street and Independence Avenue, S.W., Washington, D.C.

1. *Lancet*, 1939, 1, 765.

The medical college of the London Hospital is to be established at the Essex County Hospital, Colchester. Dr. S. A. Propert, hon. physician to the hospital, has been appointed dean's representative there.

Parliament

THE House of Commons is always at its best when paying tribute to the qualities and gifts of distinguished members who have passed from its midst. Neville Chamberlain in the latter part of his career was fated to be the storm centre of controversy, but by his death all criticism was stilled and all parties combined to pay their respects to one who was universally recognised as a man of honour and a sturdy patriot. Mr. Churchill has never been more eloquent than in the brilliantly phrased appreciation of his predecessor, uttered with deep feeling which much impressed the House. He summed up both the greatness and the tragedy of Mr. Chamberlain's life when he said that he had striven hard against events which had nevertheless contradicted him. He had been disappointed in his hopes and had been deceived and cheated by a wicked man. But those hopes and wishes, and the faith which had been abused, were surely the most noble and benevolent instincts of the human heart —the love of peace and the pursuit of peace, even at great peril and certainly to the disdain of popularity or clamour.

* * *

No social experiment in recent years has aroused more interest among members of the House of Commons than the camps scheme. Mr. Malcolm MacDonald was able to give members a satisfactory assurance that in spite of war-time preoccupation considerable progress is being made with the plan. There are now 31 camps in England and Wales, almost all of which have been completed. These have been occupied since the middle of the summer. One camp has been let to the War Office because it is unsuitable for occupation by school-children, another is occupied by an orphanage, and a third is being used as a school for cripple children. The other 28 camps have been let to local education authorities and are occupied either by individual schools or composite schools or composite schools created for the purpose made up of children from cities and towns in the evacuation areas. There are 6,000 boys and girls in the camps, but that number does not represent the total accommodation and the Board of Education are taking steps to fill the camps completely. The general results of the camps enterprise, said Mr. MacDonald, had been wholly good, and it was one of the most significant pieces of work that Parliament had lent its hand to in recent times. Not only were the children safer from Nazi airmen but they had gained permanent benefits from their sojourn in the fresh air of the country.

In the House of Lords the Workmen's Compensation and Benefit (Byssinosis) Bill has been read a second time.

QUESTION TIME

Release of Internees on Medical Grounds

In reply to a question Mr. O. PEAKE, under secretary to the Home Office, said: When it is decided to release a married man from internment it is the practice to consider the question of releasing his wife if she also is interned, but as the women who are interned are all in either category A or B, there are in many instances objections on security grounds to their release. Not all the married men released on medical grounds need nursing, but any representations made by the camp medical officers would of course receive careful and sympathetic consideration.

Medical Examination of Air-raid Wardens

Lieut.-Commander G. BRAITHWAITE asked the Home Secretary whether persons volunteering for duty as air-raid wardens were subjected to a medical examination before acceptance, observing that the widow of the late Herbert Pinder, air-raid warden, of Skeffling, Yorkshire, had been refused a pension on the grounds that her husband's death at his post was due to heart failure caused by the explosion of enemy bombs.—Mr. HERBERT MORRISON replied: It has not been considered practicable to require volunteers for the wardens' service to submit to medical examination, nor has experience shown that any general rule of this nature is necessary. I have no information with regard to the particular case mentioned, which would appear to be a matter for the consideration of the Minister of Pensions.

Disability Pensions

In answer to a question Sir W. WOMERSLEY said: Comparatively few awards of pension have yet been made by the Ministry, and those actually in issue at the present time are of varying rates suited to the immediate condition of each case, and so for the most part do not represent the ultimate pension that may be found proper.

Central Medical War Committee

Mr. T. E. GROVES asked the Minister of Health if he would state the names of all members of the Central Medical War Committee appointed by him or his predecessor in addition to, and not included in the list of, the names submitted by the Central Emergency Committee of the British Medical Association; and, in order to make it fully representative, would he now appoint members of the Medical Practitioners Union.—Mr. M. MACDONALD replied: The names asked for in the first part of the question are Dr. J. Alison Glover, representing the Board of Education, and Sir Hubert Bond, representing the Board of Control. The answer to the second part of the question is in the negative.

Our Reinforced Loaf

Mr. W. LEACH asked the Parliamentary Secretary to the Ministry of Food whether he would forbid the adulteration of white flour with calcium salt and a synthetic vitamin until the House of Commons had had an opportunity of discussing the matter, especially as a large number of doctors were entirely opposed to the proposal.—Major LLOYD GEORGE replied: The decision to introduce a calcium salt and synthetic vitamin B_1 into flour was reached by the Government after receiving a recommendation from the Scientific Food Committee, of which Sir William Bragg, P.R.S., is chairman. The Minister cannot admit the implication in the first part of the question, and he is unable to give the undertaking asked for.

Sir ERNEST GRAHAM-LITTLE asked whether, in view of recent experimental research at the Lister Institute demonstrating the nutritive superiority of wholemeal flour tested against white flour reinforced with synthetic vitamin B_1 he would consider the Government's decision as to the provision of a war loaf.—Major LLOYD GEORGE: The Minister is aware that a high-extraction flour has some points of superiority from the nutritional point of view over white flour reinforced with synthetic vitamin B_1. The reasons for the Government's decision to reinforce white flour while securing that wholemeal flour is also available to the public were explained to this House on July 18, and the Government sees no reason to reconsider the decision then announced.

Provision of Milk

Mr. R. W. SORENSEN asked whether he was aware of a shortage of milk-supplies in certain home county areas to which women and children had been evacuated; that this might adversely affect the health and domestic needs of all now living in those areas; and whether he would take measures to secure that milk supplies were made adequate according to the transfer of population from London to other areas.—Major LLOYD GEORGE replied: I am aware that temporary shortages of milk supplies have occurred in certain areas to which women and children have been evacuated. Under the system of control additional supplies are directed to such areas as the need arises, and in the majority of cases the shortage is of only two or three days' duration.

Mr. DAVID ADAMS asked whether he was aware that certain local authorities were, by advertisements in the public press and by the issue of handbills, warning those entitled to cheap or free milk under the National Milk Scheme that they would get the best and safest milk by the purchase of pasteurised or tuberculin-tested milk; and, as it was equally desirable that all other consumers of this food should enjoy similar protection, what steps he was taking to secure this.—Major LLOYD GEORGE replied: The answer to the first part of the question is in the affirmative. As regards the second part the Minister sees no objection to local authorities informing any section of the public of their opinion on the qualities of milk of various types, and he has himself issued a general statement to the effect that maximum protection against the present special dangers of infection which may exist can be obtained by the boiling of milk which has not been pasteurised or sterilised.

Cod-liver Oil and the Purchase Tax

Mr. W. LUNN asked the Chancellor of the Exchequer if he was aware that cod-liver oil was included in the taxable articles under the purchase tax; and, in view of the low butter ration and its necessity in respiratory diseases, would he make it clear whether cod-liver oil was classed as a drug or a food.—

Sir KINGSLEY WOOD replied: It has been decided that purchase tax will not be chargeable on sales of cod-liver oil, cod-liver oil and malt, and simple emulsions of cod-liver oil. [We understand that halibut oil is also exempted.]

Sugar for Munition Workers

Mr. A. DENVILLE asked the Parliamentary Secretary to the Ministry of Food, whether, in view of the scientific findings as to the energy-producing properties of sugar, and the demands for confectionery among munition workers of both sexes, he would increase and maintain the supply of confectionery to canteens and, in particular, to retailers in munition areas.—Major LLOYD GEORGE replied: Arrangements are in operation for ensuring that priority is given to the reasonable requirements for canteens serving workers engaged on essential production. Distribution of confectionery to retail outlets is regulated by the industry, but consideration is given to movements of population and to the needs of different districts.

Obituary

CHARLES WILLIAM MANSELL-MOULLIN

C.B.E., D.M. OXFD, F.R.C.S.

Mr. Mansell-Moullin, consulting surgeon to the London Hospital, who died on Nov. 10 at the age of 89, was one of the last remaining members of the brilliant band who were educated at Oxford when there was still no medical school there and the humanities were held to be at least as important as a knowledge of physic. Most of them became physicians, a few surgeons, but all bore the stamp of their early training in graciousness and culture.

Elliott & Fry.

Mansell-Moullin was born in Guernsey, the second son of Dr. James Moullin who practised on the island. He was educated privately and entered Pembroke College, Oxford, in 1868, gaining a second class in classical moderations and a first class in the final school of natural science in 1872. He was elected to the medical fellowship at Pembroke and was an examiner in biology at the final school, while the Radcliffe travelling scholarship enabled him to visit Vienna, Paris and Strasbourg. For his clinical training he went to St. Bartholomew's Hospital, where he graduated B.M. in 1876. He held house-appointments and acted as assistant chloroformist at the hospital. Two years later he obtained his F.R.C.S. and in 1879 his D.M. degree for a thesis on the pathology of shock. He then went to the London Hospital as surgical registrar and in due course was elected to the honorary staff. His appointment as lecturer in surgery at the medical college followed. He was a sound practical teacher who inspired loyalty and affection in his house-surgeons and dressers to whom he and his wife gave generous hospitality at their house in Wimpole Street. A surgeon describes him as a rapid operator and recalls an occasion when he was performing an orchidectomy. The anæsthetist had a little difficulty in getting the patient under and said "He will be ready directly, Sir." "Thanks—I have just finished" said Mansell-Moullin who was in fact inserting the last suture. His surgical work falls into three periods. At the beginning he was interested in genito-urinary surgery, and his Hunterian lectures in 1892 were on the operative treatment of enlarged prostate, expanded later in a book which ran into four editions. Then he turned to the stomach and appendix, and even in 1900 could show excellent results from gastro-enterostomy. He often operated for gastric hæmorrhage and in 1902 published a book on the surgical treatment of peptic ulcer. From 1910 onwards he became absorbed in the origin of carcinoma and his Bradshaw lecture in 1912 and second Hunterian lecture in 1914 were on the biology of tumours. Double cataract restricted his activities towards the end of his life, but his interest in cancer remained keen and even during the last five years he was writing about it.

He served on the council of the Royal College of Surgeons from 1902–15 and was at one time a vice-president. He examined in surgery for the universities of Cambridge, Glasgow and Oxford. He early became interested in radiology and in 1898 was elected the second president of the Roentgen Society. During the last war he was attached to the Second London General Hospital with the rank of colonel R.A.M.C. (T.), and was decorated C.B.E. in 1919.

He married Edith Ruth Thomas with whom he worked untiringly to secure for women the right to be trained as doctors. Both he and his wife were prominent supporters of the suffragette movement and in 1912 he was one of those who signed a report in our columns on the forcible feeding of suffrage prisoners. Mrs. Mansell-Moullin survives him with one son, now serving as a flight-lieutenant.

NORMAN FRANCIS CLIFFORD BURGESS

M.D. CAMB., M.R.C.P.

ON Oct. 18 Dr. Norman Burgess died in Bristol after a long illness. He was the son of Councillor F. J. Burgess of that town and he was educated at Clifton College and Caius College, Cambridge, where he was an exhibitioner. He qualified from Guy's in 1926 and travelling scholarships allowed him to continue the study of dermatology, which he had already chosen as his specialty, in Paris and America, where he held an externeship in the skin department of the Graduate Hospital at Philadelphia. Soon after his return to Bristol he was appointed chief surgeon to the Bristol constabulary and before he resigned in 1936 he introduced many of the more modern methods of scientific inquiry in criminology. In 1929 he became assistant physician to the skin department of the Bristol General Infirmary and in 1932 he succeeded Dr. Kenneth Wills as physician in charge of the department. He was also on the honorary staff of the Southmead, Homœopathic and Cossham Hospitals. He was lecturer in skin diseases at the University of Bristol. The high standard of his work was soon recognised in the West country and he was an enthusiastic and popular contributor to the meetings of the dermatological associations. He had published work on autohæmotherapy and on the treatment of lupus vulgaris and his practical contribution on this subject was well received at the International Congress of Dermatology held in Budapest in 1935.

In 1937 Burgess was appointed county commissioner of the St. John Ambulance Brigade and in recognition of his work for this organisation he was elected an officer in the order of St. John of Jerusalem. For many years he had been a territorial officer in the R.A.M.C. and at the outbreak of war he was appointed medical officer to an A.A. brigade but his health failed and he was invalided out with the rank of major.

He leaves a widow, a son and two daughters.

ARTHUR GRIFFIN BELLAMY

M.B. CAMB.

PROBATIONARY TEMPORARY SURGEON-LIEUTENANT, R.N.V.R.

THE death of Surgeon-Lieutenant A. G. Bellamy is announced in a list of casualties which have arisen from the various hazards of war and are not connected with any particular operation or ship. Bellamy was born in 1912, the son of Dr. J. H. Bellamy of Ashby, near Scunthorpe. He was educated at St. Lawrence College, Ramsgate, and Selwyn College, Cambridge. He entered St. Thomas's Hospital in 1933 and qualified M.R.C.S. in 1936, and the following year he passed his M.B. degree. He held house-appointments at the West London Hospital and at St. Mary Abbots Hospital, and for a time he was senior resident medical officer at the Royal National Hospital, Ventnor.

A POSTSCRIPT

Jeffery Ramsay, E. J. Wyler, R. C. Turnbull—obituary notices followed each other in this order in THE LANCET of Nov. 9, all three of them old and personal friends of mine. Ramsay was the most recent, but he was one of those men with whom, at first sight, it was impossible not to establish friendship, and I had three times enjoyed staying with him in his delightful and beautiful home, so surprisingly near Blackburn and Preston and industrial Lancashire and yet so remote amongst its moors and hills. The atmosphere of his home radiated hospitality and happiness. Had I been a patient, I could have wished my doctor to be Ramsay. Wyler was a Jew and proud of it, but always maintained that he was none the less an Englishman and proud of that. He won his M.C. and lost his leg in the first few weeks of the war in 1914. Although he had retired and had no particular reason for living in London, he told me, the day before his death, that he could not be happy away from it, as things were, and we had arranged for a little medical work that he could do. He also borrowed from me on that same day—his last, as it turned out—a book on art; he spent hours studying pictures and saw almost every show that was put on in London. Turnbull, when we were both medical students, was the first man with whom I shared independent digs in London, and the first man, owing to his own enthusiasm, who created in me a love of poetry. He was also the first man, both of us entirely ignorant of the art, with whom I spent a fly-fishing holiday. Later he became fonder of rose-growing, for which he obtained many championship trophies, and golf. Beneath a somewhat sarcastic exterior he had the warm heart of an idealist and, in his own subject, was probably one of the sanest and ablest alienists in the country. To all three, like many others, I imagine, I owe many debts. May the earth rest lightly upon their ashes.—H. H. B.

Medical News

Royal College of Surgeons of England

At a meeting of the council of the college held on Nov. 14 with Mr. Hugh Lett, the president, in the chair, Mr. Robert Milne was re-elected, and Mr. V. Zachary Cope, Mr. C. E. Shattock, Mr. M. F. Nicholls and Mr. E. W. Riches were elected as members of the court of examiners for one year from Dec. 12.

Diplomas of membership and of public health were granted to the candidates named in the report of the comitia of the Royal College of Physicians in THE LANCET of Nov. 9, p. 610, and a diploma of membership was also granted to J. C. Day of St. Mary's. Licences in dental surgery were granted to the following:

E. M. Babington, F. E. Barlow, A. E. Baxter, J. B. Bell, O. R. Berry, H. H. Brown, R. W. E. Bynoe, B. D. Clark, R. M. Courtier, H. L. P. Cullingford, Nicholas Dalton, D. K. L. Davies, D. W. A. Drew, Margery E. H. Eames, Lionel Flax, Marjorie R. Ford, A. C. G. Freer, D. L. Gabb, F. H. Glass, R. C. Green, Norman Hardy, D. S. G. Leggett, W. G. Morgan, D. C. New, J. A. Orchover, Peter Packer, R. L. Partridge, E. M. Poole, F. F. Robson, Lily Rosenbaum, G. W. Sawyer, S. N. Simpson, R. G. M. Stobie, B. P. Taylor, C. H. Vigar, J. A. Winwood, Derek Wright and P. F. M. Young.

University of Wales

At recent degree examinations in medicine at the Welsh National School of Medicine the following were successful:

Mary E. Budding, Enid Curran, A. B. J. Hill, J. E. Lloyd, Stanley Love, J. W. Morgan, D. G. Morris and K. M. Wheeler.

Health Services for Evacuees

The Minister of Health asks that the local welfare services which are already available to those evacuated under Government schemes should if necessary be extended to include all evacuated and homeless people in the area. The minister considers that hospital treatment, accommodation for infectious diseases, maternity cases and welfare services for the blind should be available to evacuees on the same terms as to local residents. He suggests that reception areas may find it possible to borrow staff from evacuated areas and proposes that sick bays should be provided for minor ailments which need not then occupy hospital beds to the exclusion of more acute cases.

Army Casualties

The following casualties in the R.A.M.C. are announced:

Prisoner of war—Lieutenant Ferdinand Duval, M.B. Sydney; Captain J. R. Heslop, M.B. Durh.; A./Major C. H. Imrie, M.B. St. And.; Major W. L. Kinnear, M.D. St. And.; Lieutenant N. E. Monteuuis, M.B. Camb.; Lieutenant William Siller, M.B. Glasg.; W.S./Captain J. R. S. Third, M.B. Aberd.

Previously reported missing, now reported prisoner of war—A./Major Edward Davies-Thomas, M.R.C.S.

Manning of Mobile Units

The Minister of Health considers that it is no longer desirable to insist on the automatic attendance of a doctor at a mobile unit each time a red warning is received. In future it will be sufficient if he is summoned from the control centre when his services are needed. But in populous areas which are being constantly bombed one mobile unit should be completely manned on the receipt of a red warning.

At the Royal Society of Medicine, 1, Wimpole Street, W.1, the section of odontology will meet on Nov. 25 at 2 P.M. when Mr. Warwick James and Mr. B. W. Fickling will read a paper on the structure of the bones of the face in relationship to fracture and other aspects of facial injuries. On Nov. 26 at 2 P.M. at the section of medicine Dr. F. G. Chandler, Dr. Clifford Hoyle and Mr. George Mason will open a discussion on the treatment of traumatic hæmothorax. On Nov. 30 the section of orthopædics will meet at Hill End Emergency Hospital, St. Albans, at 11 A.M. Mr. S. L. Higgs will open a discussion on the closed plaster treatment of wounds in the light of recent experience, and Mr. Rainsford Mowlem a discussion on the treatment of burns.

For the present all communications to the National Radium Commission should be addressed to the secretary at East Cottage, Petty France, Badminton, Glos.

The Medical Society of London will hold a pathological meeting on Nov. 25 at 2.30 P.M. at 11, Chandos Street, W.1.

On Nov. 18 Dr. G. L. Wilkinson (Middle Temple) was called to the bar.

Dr. D. A. K. Black informs us that the desoxycorticosterone acetate used in the experiments reported in THE LANCET of Nov. 16 (p. 618) was supplied by Messrs. Ciba. The abbreviation D.O.C.A. is the trade mark of another firm.

A NEW HIGH-TENSION GENERATOR

MESSRS. WATSON have put on the market a two-valve transformer, the Roentgen 11 generator; the valves are oil immersed and therefore immune to changes in atmospheric conditions and to mechanical damage in the pre-war sense. The valves may be inspected through glass windows in the top of the transformer container. The unit is designed to operate two diagnostic tubes with up to three foci. By means of the straight-line automatic control the output of the tube in use remains constant, irrespective of mains fluctuation and of variation in the line resistances. Thanks to an interlocking system of the time, kilovoltage and the tube in use at the moment, overload of the tube beyond its safe limit is impossible. A good range of kilovoltage and milliamperes is at the disposal of the operator and a consistent output ensured. The main switch is incorporated in the control table, and the change over from one tube to another is operated by a control handle on the transformer cabinet. The switch itself is mounted inside, where it can be easily inspected and cleaned. The room-lights can be operated from the control table. Radiographic exposures are operated by a hand-switch and change over to screening is effected by a foot-switch, which, automatically adjusts the current to the screening setting and also controls the red room-lights. The transformer cabinet has a base 39 in. by 39 in., and is 73 in. high; the control table is 44 in. high, with a base 25 in. square.

A pre-reading kilovoltmeter, with values for the studs on the controls, would probably have been better than a calibration chart. Most radiographers would soon cease to consult the chart, and any inquiry as to what penetration had been used for a particular patient could be met with the reply "Stud 7." The extract from standard exposure times appears optimistically short. The apparatus would be suitable for a private installation or for a hospital with about 100 beds.

SHELTER HYGIENE

RECOMMENDATIONS OF THE HORDER COMMITTEE

ON Tuesday the recommendations of the Horder Committee on conditions in air-raid shelters, together with an account of the steps taken by the Government to implement them, were published as a White Paper (Cmd. 6234, 2*d*.), and on the wireless in the evening Lord Horder explained their implications and urged swift action. The committee was appointed by the Ministers of Health and Home Security on Sept. 14 and more than half of the recommendations now published were in the ministers' hands by Sept. 18. The remainder have been made at intervals up to Nov. 12, and others will be made as required.

The first seven sections contain suggestions for mitigating what the committee call the crux of the problem—overcrowding. Some of these remind us how rapidly events have moved in the last two months. For instance, section 5 puts forward the possibility of using the tube system for shelter during the night. The committee urged the need for the popularisation of domestic and surface shelters by publicity and demonstrations; for lights and bunks; for the allocation of surface shelters to specified residents; for a re-survey of shelter accommodation in basements, railway arches and the like, and the requisitioning at night of factory and commercial shelters only used by day; for the evacuation of the aged, infirm and bedridden and of children under five, and vigorously pushing on with other evacuation schemes. The White Paper points out that some 4000 aged and infirm people frequenting the London shelters have already been transferred to E.M.S. hospitals in the country, and that, in addition to the extension of the evacuation scheme to mothers with children of school age or under, 4500 unaccompanied children under five have been sent to residential nurseries and 1500 more to billets in the country.

Next the committee proposed the appointment of whole-time paid shelter marshals, a number of whom are now at work in London and elsewhere. They also pressed for adequate sanitary equipment with extra staff for keeping them and the rest of the shelters clean; the White Paper says that instructions have been given that this should be done. In sections 10–12 the committee recommended regular inspection of shelters by the M.O.H. and his staff, provision of first-aid points in large shelters, and posting up of instructions covering ventilation, proper usage, personal behaviour and cleanliness.

Details of medical aid posts are given in section 13.

(*a*) Beds and bunks should be allotted to the medical aid post at the rate of 2 beds and 3 three-tier bunks for every 500 persons in the larger shelters. These bunks should be placed so as to allow expansion of the post if necessary. There should be the same allocation for a group of contiguous smaller shelters.

(*b*) The medical aid post should be large enough to allow of screening off patients for simple medical examination.

These recommendations, with a schedule of equipment and drugs for the aid posts prepared by the committee, are incorporated in instructions issued to local authorities.

VENTILATION, DISINFECTION AND IMMUNISATION

"It is utopian to expect," say the committee," that the standards of cubic air-space per person usually quoted can be fulfilled, at least to begin with." Until the present overcrowding is eased they suggested that in naturally ventilated shelters a standard of 50 cu. ft. per person should be followed, and that the question should be reconsidered later. They urged the full use of whatever means of ventilation exist, specific instructions being issued to shelter marshals, and they say that a dominant factor making for general discomfort and air pollution is the presence in the shelter of closets; they recommended that wherever possible the men's closets should be placed outside the shelter proper.

On the closely inter-related questions of ventilation and heating the committee recognise that the ideal solution would be air-conditioning, but they say that since this is not practicable, ventilation by natural means must be assumed. They go on:

It should be an instruction to all shelter wardens to see that ventilation shafts, openings in brick work, and other methods of securing the entrance and exit of air are fully open, including the time of a raid. Efforts should be made to control floor draughts, and in large shelters attempts should be made to admit incoming air at high levels, so as to mix with the warm air.

There are objections to heating the majority of shelters during their occupancy which outweigh the advantages. The use of coal and coke entails dangers from fumes. Gas and electricity are subject to interruptions, and have their own special dangers.

Shelters which are liable to crowding do not require heating, even in winter. Such danger to health as there is in connexion with the temperature of a crowded shelter lies in the possibility of too high, rather than too low, a level. It is the sparsely occupied shelter which presents the greatest difficulty. Here some form of heating during the latter part of the daytime might be considered. This would help to popularise the surface shelters. But it is clear that, in regard to the problem of heating, each shelter must be dealt with on its merits.

Individual expedients are to be encouraged, both in the form of improvised sleeping-bags, hot-water bottles, and/or hot bricks. In the smaller communal shelters the device of a candle under a flower-pot is quite helpful.

Further investigation is being made, says the White Paper, into the possibilities of heating surface shelters.

The committee say "there is sufficient evidence for considering that the risk of air-borne infection may be reduced by spraying the atmosphere of shelters." On account of its easy procurability, cheapness in bulk and intrinsic merits the antiseptic they recommended is sodium hypochlorite in aqueous solution, the spray used ranging from mechanically operated to hand-operated apparatus, according to the type and size of shelter. Provision is made for a spray in the schedule of equipment, and different kinds of spray are being examined by the Medical Research Council.

As to other protective measures, in the committee's opinion the disease most likely to arise in increased incidence as the result of shelter conditions, and against which protection by inoculation is of proved value, is diphtheria, and they urged that local authorities should be encouraged to popularise protective inoculation and that diphtheria toxoid should be supplied free by the Ministry of Health. There is no good evidence, they say, that the supply of vitamins in the form of medicines reduces the incidence of the common bacterial infections, and they do not advise their use in that form.

Tests are being made with masks to prevent droplet infection, and other methods, such as throat-spraying, are under consideration; the use of ultraviolet light and "ultra-Sonics" to reduce infection is not advised. The risks of the spread of body-vermin in shelters will be the subject of further recommendations.

Births, Marriages and Deaths

BIRTHS

ASHTON.—On Nov. 18, the wife of Dr. Gerald Ashton, of Dunstable—a daughter.

CARDEW.—On Nov. 15, at Watchet, Somerset, the wife of Dr. H. B. O. Cardew—a son.

CHRISTIE.—On Nov. 7, at Tuxedo Park, New York, the wife of Prof. Ronald Christie—a son.

MAURICE.—On Nov. 13, at Savernake, the wife of Dr. Timothy Maurice, of Marlborough—a daughter.

RUTTER.—On Nov. 14, in Edinburgh, the wife of Dr. T. E. Rutter—a son.

MARRIAGES

DINGLE—WATT.—On Nov. 15, at Aberdeen, William Thomas Dingle, M.D. of Winnipeg, to Dorothy Mabel Robertson Watt.

DEATHS

ACKLAND.—On Nov. 15, at Bideford, Charles Kingsley Ackland, M.R.C.S.

BENSLEY.—On Nov. 13, at Southsea, Clement Henry Bensley, C.I.E., M.R.C.S., Colonel I.M.S. (retd.).

BUSHE.—On Nov. 16, at Newton Abbot, Erasmus Bushe, M.R.C.S., aged 88.

LOVIBOND.—On Nov. 16, in London, Beatrice Frederica Lovibond, M.B. Lond., aged 67.

PARRY-JONES.—On Nov. 15, at Torquay, Maurice Parry-Jones, M.D. Lond., aged 80.

TAWSE.—On Nov. 12, Herbert Bell Tawse, M.B. Aberd., F.R.C.S., of Nottingham.

TILL.—In November, 1940, by enemy action, Albert Thomas Till, M.B. Edin., D.P.H., D.T.M. & H., aged 40, medical officer of health for Mitcham.

WARD.—On Nov. 13, at Wallasey, Basil Vernon Ward, M.B. Manc.

Notes, Comments and Abstracts

HISTORY OF HÆMOSTASIS AND THE LIGATURE

IN his inaugural address to students of the Royal Victoria Hospital at Belfast on Oct. 10, Mr. G. R. B. Purce, F.R.C.S., said that the relationship between life and blood was known to primitive man, for blood played an important part in religious ceremonies and mystic rites. The Ebers papyrus of 1560 B.C. told us that the Egyptians used the red-hot cautery to stop bleeding and were familiar with such styptics as lead sulphate, antimony and copper sulphate, but Celsus (A.D. 30) was probably the first writer to mention the ligature. He directed that bleeding vessels should be pulled up, ligated on either side of the injured point, and then cut across. Galen (born in A.D. 131) advised placing a finger on a bleeding point; if the artery were deeply seated, it had to be seized with a hook and ligatured. His ligatures were of Celtic linen, were bought at a shop in the via sacra, and they may have come from Scotland. In medieval times surgeons were concerned about the type of wound gunpowder produced. John de Vigo (1514) taught that they were poisoned and should be purified by the red-hot cautery and boiling oil.

When the supply of boiling oil gave out at the capture of the Château de Villane, Ambroise Paré was forced to rely upon a single emollient dressing for the wounded, and the good results led him to abandon the practice of cauterising wounds. In 1552 he amputated the leg of an officer and used the ligature to check bleeding. He used an instrument called the "bec de corbin" to seize the bleeding points, and he ligated the part en masse. His methods gained no immediate acceptance, probably because the tourniquet was not understood. Narrow bands of cloth above and below the amputation site were used to check bleeding. Morel advanced the use of ligature when, at the siege of Besançon in 1674, he introduced a stick into the proximal bandage, and twisted it to stop arterial hæmorrhage.

By the eighteenth century the tourniquet was firmly established. The ligatures used by Cheselden in England and by Heister in Germany were of waxed thread. The great difficulty was secondary hæmorrhage which it was noticed depended upon the degree of suppuration of the wound and the amount of foreign material left in it. Attempts were made to devise absorbable ligatures. Buckskin was tried in America, and Ephraim McDowall was credited with having used it to tie off the pedicle of ovarian cysts. In the nineteenth century, John Hunter's work on the establishment of collateral circulation after ligature led to its adoption in the treatment of aneurysms. Surgeons such as von Graefe the elder, Roux and Pirogoff, began to undertake major operations, and to meet their needs the modern artery forceps was evolved, of which the Spencer Wells (1872) was the original. In 1868 Joseph Lister ligatured the carotid artery of a young calf with catgut which had been soaked in a watery solution of carbolic, and in 1881 his chromic gut was introduced. He had chosen catgut because it was the only absorbable animal tissue which could be easily obtained. The origin of its name was obscure, for it had never been made from the intestine of the cat, but was obtained from the sheep. It had been used for the strings of bows, harps and other instruments by the Assyrians, Egyptians, Hebrews, Greeks and the Hindus. Galen, indeed, had suggested it as a substitute for linen ligatures, but probably it had not been used before Lister's time because of the danger of its anaerobic contamination.

TIME AND THE WORLD'S FAIR

IGNORING the carping spirit of the man who said "What has posterity ever done for me?" the Westinghouse Electric and Manufacturing Company bequeathed the time capsule to the future at the World's Fair last September. It was an imaginative act carried out with sumptuous scientific precautions. The capsule weighed 800 lb. and contained a microfilm illustrating our times, a microscope to read it by, and directions for constructing a larger reading-machine and a motion-film projector. A dictionary, a multilingual text, a lexicon of idioms, a fountain pen, a tobacco pouch with a zipper, a woman's hat, a tin-opener, various textiles, samples of coal and seeds and many other objects are stored away there to puzzle and entrance archæologists five thousand years our juniors. Mr. David S. Youngholm, vice-president of the company, in his address (*Science*, Oct. 4, 1940, p. 301) spoke of it as a letter to the future and explained its construction. A shell of cupaloy has been set in asphalt, and its central cavity, 7 ft. by 6½ in., is lined with Pyrex glass and filled with nitrogen. The capsule has been laid on a concrete bed at the bottom of a steel-lined well 50 ft. deep; and archæologists are requested to leave it alone until 6939. Of course they may reckon time differently then; but that gives them no excuse. The U.S. Naval Observatory has provided astronomical data from which they can find out and note what year they are living in, like Christians; and this information, with full directions for finding the capsule mathematically, has been printed in permanent ink on special rag paper and sent to libraries and museums all over the world. Some of these records will survive, Mr. Youngholm thinks. But will the capsule? Where Egyptian relics have defied decay this elaborate structure will surely do so too; but what about the archæologists? Will they be able to keep their fingers off it for more than a couple of centuries? And if they do, may not the lion and the leopard keep the courts of Chicago when the time comes? Or perhaps man, continuing his present downward trend, may come on it as a puzzled savage and pull it foggily to pieces. But it is pleasant to hope that a race of sensible fellows, better at managing their affairs than we are, will unearth it and shake their heads over the bad old times. Who can say? Truth and the time capsule both lie at the bottom of a well.

THE ORIGIN OF KINGSHIP

Mr. Andrew Rugg-Gunn holds (Osiris and Odin: the Origin of Kingship. H. K. Lewis. Pp. 182. 8*s*. 6*d*.) that civilisation rests on three bases—kingship, agriculture and religion—and to prove his points he follows a fascinating course from the beginnings of time; through the cult of the life principle, worshipped as an all-pervading nature goddess, and associated with communism and human sacrifice, to the coming of Osiris, the first king, who brought agriculture, and with it the rights of private property, to the inhabitants of the Egyptian delta; who died, and lived again to be their god. From Egypt to Scandinavia is a far cry, but there was traffic between the two in the bronze age, and the link between Osiris and Odin seems clear. There are in Scandinavia many places whose names contain the element Odin, and in these districts, and these only, are to be found remains in the megalithic style of buildings used by the Egyptians. Odin was admittedly a foreigner who came by sea, and with him came Mr. Rugg-Gunn's three foundation stones of civilisation. He carries his argument up to the present day, and deals with the age-old origins of our own coronation ritual. Indeed the book is remarkable for the importance it attaches to ritual, by the aid of which the author claims it is possible to subject the unconscious to spiritual control, and "to receive glimpses of supernal wisdom." Surprisingly, he feels that modern civilisation is threatened chiefly by the growth of feminine ideas, coupled with the standardisation of the male intellect by factory work and other mass influences. Communism he considers to be incompatible with civilisation, but thinks that we may possibly revert to it by way of matriarchy and human sacrifice. The latter part of his prophecy seems to be in a fair way to fulfilment, and the former might make a nice change.

Appointments

BUTTERWORTH, JOAN, M.B. Lond., D.P.H.: asst. M.O.H. for Bristol.
BACON, L. J., B.Chir. Camb., D.P.H.: temp. asst. M.O.H. for Birmingham.
MACKICHAN, I. W., M.B. Camb., D.T.M. & H.: M.O. for Uganda.
RUSSELL, J. F., M.B. Glasg., D.P.H.: M.O.H. for Chorley.

The Radcliffe prize which is open to medical graduates of the University of Oxford will be awarded in March 1941 for research in any branch of medical science. Further information may be had from the secretary of faculties at the University Registry, Oxford.